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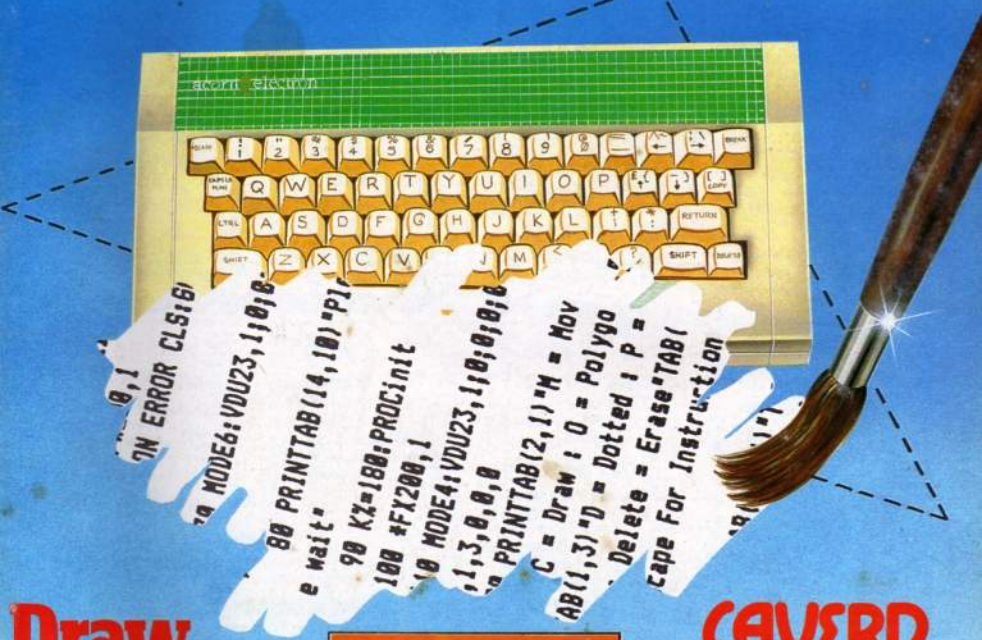

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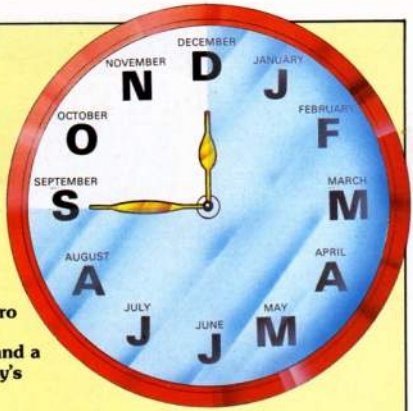
Yes – it's bargain-hunting time again!



For BBC Micro and Electron users this is the start of the top buying period of the year – the time when they stock up with all the latest hardware and software that will enhance the versatility, power – and just sheer fun! – of their micros.

And the ideal time to hold the Electron & BBC Micro User Show, where they get the best of both worlds – a first look at all the fascinating new-season products, and a chance to pick up really worthwhile bargains as yesterday's top sellers are sold at rock-bottom prices!

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electron user NEWS

Bargains galore at the big Show

MORE evidence of the growing maturity of the Electron will be on display in Manchester at the end of this month.

September 26, 27 and 28 are the dates when the Electron & BBC Micro User Show rings up the curtain on the great pre-Christmas shopping bonanza at the Renold Building, UMIST.

Upwards of 75 manufacturers and suppliers will be exhibiting at this great Northern showcase for the Electron, and many have already indicated they will be bringing along exciting new products.

Apart from the latest hardware and software developments there will, as usual, be a treasure trove of bargains at the show, which traditionally marks the start of the busiest buying season for Electron owners.

A major attraction will undoubtedly be the new products that have dramatically enhanced the overall performance of the Electron and given it BBC Micro-like capability.

For instance, the AP4 disc interface from Advanced Computer

Turn to Page 6

Electron's big brother is due any day now

ACORN is on the verge of delivering the latest addition to its machine range – a big brother for the Electron.

Weighing in at around £500, it is expected to take its bow any day, despite the fact that company officials are still denying its existence.

The new micro – nicknamed the Baby BBC, as was the Electron before it – is expected to come bundled with monitor, 3½in drive and software.

As such, some experts are already viewing it as an Amstrad basher at the lower end of the business market.

Usually informed sources suggest that the new Baby will be highly compatible with existing Acorn models,the main drawback, as with the Electron, being possible lack of user ports.

It is claimed that in appearance it will be very much like the Master.

The Baby is likely to incorporate a revised ROM and will be bundled with specially written software from Acornsoft and other companies.

It is thought that the machine will be targeted at Acorn's stronghold, the education market.

However not everyone feels that the big brother to the Electron will be an overnight success.

"It depends entirely on the user port situation", a leading educationalist told *Electron User*.

"If they are limited, as rumour has it, then it might well turn out to be a case of having to throw the baby away with the bathwater.

"Mind you, if there is an ample number, we could have a new child star on our hands".

One report, yet to be confirmed by either party, is that Acorn has made arrangements for Dixons to market it during the run up to Christmas.

Asked about the new big brother for the Electron, an Acorn spokeswoman replied: "It's very interesting speculation".

Aid for Ethiopia

ELECTRON users have helped to raise more than £5,000 for Ethiopian famine relief.

They were among hundreds of micro owners taking part in marathon sessions of the cult role-playing game Dungeons and Dragons up and down the country.

The main effort was a Dragonathlon coordinated by Adrian Mars at the Trafalgar Square Community Centre in London where two teams of nine played a continuous 84 hours.

BOOM SPARKS MORE SOFTWARE

A NEW software house has been launched to take advantage of the booming Electron market.

Riverdale Software will produce programs for other popular micros but is basing its strategy for success on the Electron.

Company director David Edwards told *Electron User:* "We are strongly committed to the Electron, convinced that it has a long life ahead of it.

"We want to consolidate the recent revival in software support for the machine. In fact we are developing all our programs initially for the Electron before converting them for other machines".

First from the Riverdale stable is a DIY horoscope program called Paranormal, which provides users with predictions based on their time of birth.

"A lot of research has gone into this, and we believe it will intrigue users because it covers your past, present and future all on one tape", said Edwards.

The ESP section of the program checks the user's psychic abilities.

Reincarnation reveals if the user has lived before and as what.

Numerology assesses character, and Biorhythms gives a reading of mental, physical and emotional powers.

Second release will be Suds, an adventure based on soap operas.

Fighting the flab with an Electron

An Electron has been called in to help fight the flab in Glasgow.

It is being used as the nerve centre of a slimming club frequented by overweight ladies in the city.

Since the Electron was introduced three months ago, members have shed more than one ton of surplus fat.

One 40-year-old dieter has lost nearly four stone during the period.

"The results have been far better than we ever expected", Anne Wheeler, manageress of Super Weight Loss, told *Electron User*. "It seems to have provided the stimulus our members needed".

The Electron's role is to record weights taken at the weekly meetings, then to present them in graph form.

It is also used to collate data on everything members have eaten during the previous seven days, providing a complete calorie count.

The machine has been programmed to come up with diet suggestions for the week ahead based on individual requirements.

"We feel that this is where we are scoring over other diet clubs", says Ann Wheeler, "for our micro allows us to assess individual needs rather than just lay down across the board rules.

"It has meant that we have been able to analyse accurately just how well people have been doing – or more importantly where they have gone wrong".

Paula Thompson, the club's star dieter, is overjoyed with the Electron.

"I've been on hundreds of diets before but none of them worked", she said. "Now I've got a machine to thank for helping me get slim".

Ah well, that's life..

THE joke was on Electron User *when the magazine found itself unwittingly on the That's Life television show.*

And it was all the fault of Jet Set Willy. For a reader just couldn't resist sending in the review of the game that appeared in the July issue.

It was left to Molly Sugden, the star of the show responsible for reading out "bloopers" in publications, to reveal to the millions of viewers Electron User's *now famous double entendre.*

Reviewer Carol Barrow, having struggled successfully to avoid the pitfalls of using the word "Willy" in the wrong context through most of her article, managed to fall spectacularly at one literary hurdle.

"When you load up game for the first time", she wrote in all innocence, "you are provided with eight Willies".

Molly Sugden . . . found a "blooper"

If that was not enough, she felt moved to add: "This might seem to be very generous but there is a problem".

Molly Sugden, best known as Mrs Slocombe in Are You Being Served?, the studio audience and the viewers at home were highly amused by their first look at Electron User.

New products at Show

From Page 5

Products which opens up the Electron to a vast pool of software previously restricted to the BBC Micro.

It features a 1770 DFS as standard, running with page at &E00, and costs £69.95.

The Yorkshire-based company is also planning to demonstrate its AP5, which will effectively add three more interfaces to the Electron.

It combines a 1MHz bus – providing the same I/O as that on the BBC Micro – and a Tube interface for about £50.

The firm has also produced a user port for connections to the AMX Mouse and CAD/CAM applications.

It will also be demonstrating its &E00 DFS which uses the 1770 DFS as in the BBC Master. When used in conjunction with sideways RAM products it allows the user to run a disc system at &E00.

Care Electronics is launching its Electron ROM extension cartridge for use with word processing chips and toolkits for about half the price of Acorn cartridges.

Shards Software is launching its new spy adventure Operation Sasras, a sequel to Pettigrew's Diary, on cassette at a special introductory price.

In addition there will be the Acorn Theatre where each day leading experts will be describing all the latest developments at Cambridge.

The show is open 10am to 6pm Friday and Saturday, September 26 and 27, and 10am to 4pm, Sunday, September 28.

ON-LINE LISTINGS

ALL program listings in *Electron User* are now available for free downloading on MicroLink, the UK's fastest growing electronic mail service.

They will join hundreds of programs already available on Britain's national online database.

Acorn-Superior software deal

ACORN and Superior Software have become partners in an arrangement that is good news for Electron users.

The companies are combining forces to provide a continuing supply of top quality games and home entertainment software for the Electron.

Programs released under the agreement will carry a joint Acornsoft/Superior Software logo.

The arrangement provides for new programs to be written by Superior Software's team of authors. In addition several existing Acornsoft titles will be repackaged.

First of the joint releases should appear this month, and there will be at least three for the Electron in the shops by the end of autumn.

Galaforce, written by *Electron User* contributor Kevin Edwards, is described as "the ultimate shoot 'em up game".

It comprises a series of screens with aliens flying in 50 different formations, and a high score competition.

Acorn's contribution will include two compilations – Acornsoft Hits I and II – with four games on each cassette. Elite will be among the titles re-released.

Prices are expected to be £9.95 on cassette and £11.95 on disc.

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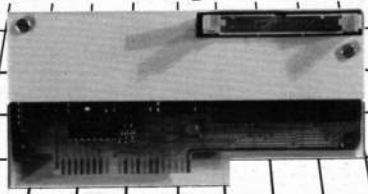

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Speedy Sim gives you lots of lives

FIRST of all the bad news – I'm only going to include a short piece on Citadel in Feedback this month. Now the good news – in response to the vast number of questions that have been raised about Citadel I have decided that I will do a special on it next month.

In the meantime Robert Duck has written to report that **Rick Hanson** will not allow you to load or save a game with the Plus One enabled.

David Roberts has sent in a tip for those of you who are having trouble with **Sim**. When it has loaded press Break and type:

```
*RUN SIM4
```

When that has loaded go into Mode 2 and type:

```
&198B=255:CALL &1980
```

This will speed up the game and also give you 255 lives.

J. Elson is one among many who have written in with help for Keith Inman and Andrew Rogers in **Citadel**.

- The starport is on top of the temple.
- To get past the temple you must first get the blue and white key in the west wing near the drawbridge. Take this to the central castle above the main hall and open the door.

Get the crystal and walk into the fridge and get the chicken. Take it to the coloured base in the kitchen to cook it.

Go to the temple with the now red chicken and as you walk over the coloured base you will hear a sound. The chicken will disappear and you can walk into the next room.

Place any crystals you have on to the base where the trampoline is and climb up the rope into the starport.

- To kill the mummies take the Egyptian heads into the pyramid and place them on the coloured bases.
- To obtain the blue and green key get the ice crystal from the cellar under the main hall and take it to the East tower. The water will freeze and allow you to cross and get the key.
- The crystals look like raindrops.
- If the man in the witch's house is the monk use a spell. If it is the witch then go to the west tower and jump on to the trampolines, pressing the up and jump keys at the same time.

Jump on to the rope in the screen above, climb up it and

SOS

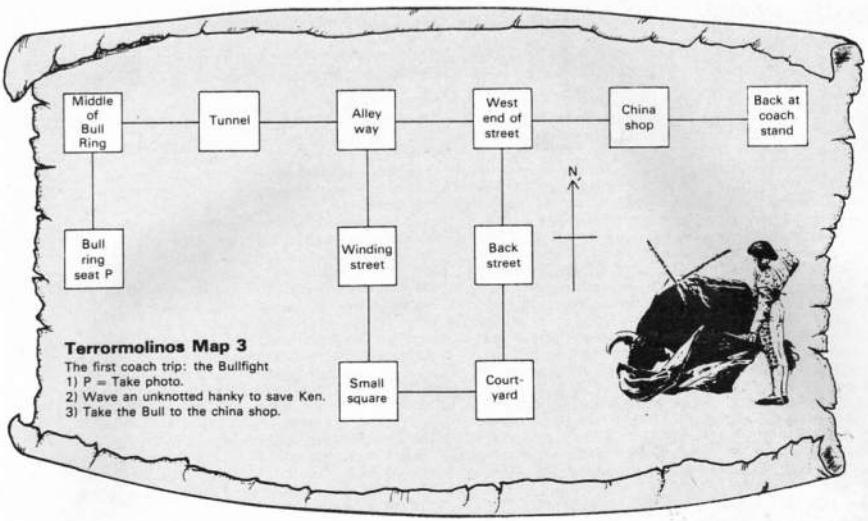
Margaret Nuttall has written in to ask for help with **Seek**. The only game of this name that I have heard of was available some years ago on the BBC.

However it was discontinued because it wasn't compatible with Basic II, the ROM that found its way into the Electron.

Anyway can anyone help with the following and also give me more information on the game itself. How do you get out of the crypt and what is the pole for?

Alan Allcock would like to know the following – in **The Pen and the Dark** how do you get through customs? In **Lord of the Rings** how do you get the medallion off of the green knight?

Finally in **Star Trek**, when you are on the planet how do you get up the smooth mountain without slipping? Can anyone help here?



Terrormolinos Map 3

The first coach trip: the Bullfight
1) P = Take photo.
2) Wave an unknotted hanky to save Ken.
3) Take the Bull to the china shop.

jump off on to the lift. Then jump up to the screen above and climb up the tower. Get the skull and jump down to the right.

Go into the room with the witch and drop the skull into the cauldron. Do the same with the two bones – one is in the pyramid and one in the East wing. Wait for the witch to fly into the cauldron and she will die.

- To get to the palace put all the crystals in the starport and stand on the table.
- It is not necessary to open the drawbridge.
- To find the other crystals read Tim Walter's letter in Micro Messages in May's *Electron User*.

Getting away from Citadel the Headless Horseman has written in with help for Alan Allcock with **Old Father Time.** Alan should find the coins, rod, keys, lamp and mirror and dig in the location where he found the lamp.

A word will be revealed which he can use to get past the beam of light. Apparently the word I thought you used, which is seen on the wall, is an anagram that comes into play after you are past the beam.

Also the writing on the Greek coin is not important, but the coins must be used later.

CONTACT CORNER

If you want an adventure pen-pal why not write to one of the readers mentioned here?

Anyone who wants their name included should write in, making sure that their name and address is legible.

- Margaret Nuttall, 131 Beldon Road, Sheffield, S2 3UR.
- Alan Jones, 5 Hayes Close, Newtown, Bristol, BS2 0AG.
- Craig Romans, 1 Glamorgan Street, Barry, South Glamorgan, South Wales, CF6 8JP.
- Iain Ellis, 72 Seaview Crescent, Joppa, Edinburgh, EH15 2LR.
- Laurence Taylor, 9 Daddlebrook Road, Alveley, near Bridgnorth, Shropshire, WV15 6NT.
- Robert Henderson, 86 Admiral Street, Liverpool, L8 8BR.
- Christopher Seatory, Don Torre, Cambridge Avenue, Donwell, Washington, Tyne and Wear.

LORDS OF ADVENTURE

Latest peer is Harry Bastien, 2 The Beeches, Tilbury, Essex RM18 8ED.

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Larry Horsfield, 40 Harvey Gardens, Charlton, London SE7 8AJ has also been ennobled.

Larry offers help with **Sphinx Adventure, Twin Kingdom Valley, Wheel of Fortune, Quest for the Holy Grail, Castle Frankenstein, Dracula Island, Eye of Zoltan** and **The Five Stones of Anadon.**

He is also willing to help with **Sadim Castle, Greedy Dwarf, Crown Jewels, Galadriel in Distress, Staff of Law, The Wizard Akyrz, Perseus and Andromeda, Feasability Experiment** and **Mystery Fun House.**

Let me stress that if you write to one of the Lords of Adventure for help with any of these adventures you must enclose an sae.

HALL OF FAME

Woodbury End *Les Shipton*

Colour bar for bars. You need the book to gain access to the beast's cell – East from the grille. Leave the beast, but look at least. Look in the beast's cell to get the block.

Compass points zero in but can make a din. Take the block and the cube to the clearing separately to get the emitter.

Daily routines can make life predictable. Shoot Fred Bates with the emitter. Who to believe? Trust you mind not your heart. Shoot PC Armstrong too. Suspicious minds – short temper. Shoot Mrs Ackroyd.

Truth may be false if honesty lies. Shoot Mayor Hardy as well.

→

From Page 11

Murder is sin, be careless or win. Shoot George Roberts.

Initially the ball is the point. Take the pen to the beast and look. South for vessel emblem will tell. Blow up the alien spacecraft.

Wheel of Fortune (continued) – *Craig Romans*

You will find yourself in some more caves. Use the lamp and fill the bucket with water from the underground pool. Collect any treasures that are lying around and search for an exit.

When you find the dragon use the water in the bucket. You will now be able to go across the valley and enter another cave complex. Use the ladder to get across the large pit. Search thoroughly for treasures, then leave the caves and go to the road.

Search the road in both directions and use the gun to shoot the werewolf when you come across him. Going south will find you on the north bank of the canal. Get all the treasure here and then go to the bridge housing. You must watch your timing as you need to pick the lock, but will go to jail if the policeman catches you.

The lock must be picked nine times to open the door and when you have done this you must go in, oil the machinery and then pull the handle.

Search the outside of the housing for treasure, cross the bridge, go to the trc^{S}s cave, drop all your treasures and get your score.

If you have less than 8500 you may have missed something. Make sure you have everything and then go up through the trapdoor and get the watch and key that you should have left there.

Now spin the wheel and the screen should flash and tell you that you are back on the country lane where you started. The treasures you should have are gold bar, statuette, pearl necklace, diamond brooch, key, watch, painting, medal and tray.

You should also have bracelet, truncheon, gemstone, trinket, music box, sapphire, pendant, banknote, portrait, ore, purse, tiara, coronet, figurine and lucky charm.

The Count (continued) – *A.J. Haynes*

Day Three: Tie the sheets to the bed and drop them over the ledge. Go and get the tablets from the vial, matches, torch, pack of cigarettes and garlic. Go to the kitchen and wait for sunset. Light torch and enter the oven. Take the file, then go to the ledge and climb the sheets.

Remove the portrait in the doorless room and then enter into the passage. Smoke a cigarette in the crypt, then open and enter the coffin.

Break the lock with the file, then store your possessions again and go to bed. Take care to remember to put the torch out before climbing the sheets and use the tablet if you start to feel sleepy.

Day Four: Go and get the cigarettes, matches, stake, mallet and torch. Go to the crypt and kill Dracula to finish the adventure.

The game can be completed in three days if days two and three are done as one, but you should be careful not to run out of time.

PROBLEM CORNER

David Ashbury wants to know how to get up the slope in **Castle Frankenstein** without being killed by the rocks that fall down from above. Wear the hat from the shop.

David Bottomley wants to know where the saddle is and how to mend the jug and what to use it for in **Ring of Time.**

The saddle is in the abbot's bedroom. Use wax from the candle to repair the jug and then fill it with water and pour the water on the grave.

Vi Rutherford has some questions about **Philosopher's Quest.** The cheese is south-east from Piccadilly Circus.

To get into the library leave all of your possessions before going into the "cease to exist" passage, but make sure that you leave your lamp switched on.

Then when you cease to exist THINK and then RUN EAST, get the lamp and return to the library.

Alan Allcock would like to know where he can find the matches. You'll find them north-east of Piccadilly Circus.

Anthony Lee is stuck in **Rick Hanson.** To stay the night you must play the fruit machine and use the impi. The razor is to let you shave in the bathroom.

The significance of the number on the brass frame in the church is that it must be used on the keypad in the computer alcove.

Robin of Sherwood (continued) – *Martin Hanson*

When talking to Herne you will have learned that you need to return six touchstones to their rightful place. This is Rhiannon's Wheel and is one location North and several West of your start location in the forest.

To get your first stone go to the holy tree and climb and examine it. Now go to the waterfall and into the cave behind it to get the sword Albion, a long bow and a quiver of arrows.

Then go to the stream and get the quarterstaff and fight Little John. Take him to the outlaws' camp and wait. After this go back to the start location and GO NOTTINGHAM.

Once there you must ENTER the COMPETITION, FIRE ARROW and GET SILVER arrow. You'll find that you can't use the same escape route so GET SHERIFF, GO GATES and DROP SHERIFF. Now go to Belleme's castle and kill him with the silver arrow. Search his body and get the arrow again. Now untie Maid Marion and tell her to follow you.

Go to the Abbey and move two locations East, EXAMINE, GO CAVE and then GO NORTH where you will find Siward.

Sphinx Adventure *M. Alexander*

N – TAKE BOTTLE – N – IN – TAKE LAMP – TAKE KEYS – OUT – S – E – E – D – LIGHT LAMP – S – TAKE CARROT – W – W – TAKE WAND – E – S – TAKE SWORD – D – TAKE FOOD – W – FILL BOTTLE – E – N – THROW WATER

E – N – TAKE SILVER – S – WAVE WAND – CROSS BRIDGE – TAKE RUG – E – TAKE BOOKS – U – W – N – E – S – S – FEED CROCODILE

E – S – W – TAKE OPALS – E – S – U – WAVE WAND – GET RING – D – N – N – E – E – TAKE COINS – W – U – S – TAKE STAKE – S – W – TAKE GOLD – RUB RING.

Countdown to Doom *Craig Romans*

To get out of the spaceship – GET EXPLOSIVE, NORTH, LIGHT FUSE, DROP EXPLOSIVE, SOUTH, wait for explosion, NORTH, PUSH DOOR, NORTHEAST.

The treasures are dilithium crystals, spices, sword, diamond and the black hole. The equipment you need is – motor, nuclear reactor, perfect conductor, new navigator box, visionary drugs, monopole generator and a life support system.

Not the one for Wimps

Program: Geoff Capes – Strongman
Price: £8.95
Supplier: Martech, Bay Terrace, Pevensey Bay, East Sussex BN24 6EE. Tel: 0323 768456.

CAN you emulate Geoff Capes by becoming the strongest man in the world? That's the idea in this game from Martech in which you must endure the hardships of a strongman championship.

There are six events, some with the computer as your opponent but others are an individual challenge against the clock. The instructions are well written, but list the events in the wrong order, which proved a real irritation until I'd begun to master some of the problems.

Before the games start you must earn some muscle by hammering two keys as fast as you can. As a keyboard saving alternative, a touch on Return will grant you a random amount of strength. Having earned your muscle, you then distribute it around Geoff's body by selecting various screen icons.

After this, the first event begins. A car falls on you and you must turn it over. The method is simple: The muscle symbols flash in turn and you move your arrow to that symbol and hit Return. There is a time limit but with practice the necessary coordination can be mastered.

Next comes Sumo wrestling. Move left and right and then lunge at your opponent to push him out of the ring. It's easy but what a shame it's all over in two seconds.

Event three is the fairground bell-ring. You move the hammer into position and then wallop the keys to bring it down fast on the button. Positioning the hammer is rather chancy. It depends on which muscles flash and in which order. This one proved an annoying stumbling block for me many times.

In the next event you must chop through a log within an qualifying time. As an axe moves along the log you press Return to chop into the soft parts of the wood. This event requires timing, but little else.

The tug o' war proved my undoing. The instructions say that the method is the same as for the car roll. However each time I played I was pulled into the river, which meant I have not seen event six, barrel loading.

The instructions make this sound quite fun, with a lot of keyboard hammering and precision timing involved, but it's obviously not for uncoordinated weaklings.

As usual with Martech software, the programming is excellent, the graphics are smooth and fast and the sound is sensible. But something is missing. The World Strongman competitions on television make compelling viewing. By comparison, I found the computer simulation boring and rather frustrating.

My best performance has rated me as Mr Puniverse, but more often I end up at Wimp level. I know lots of people who like this kind of game, but I would invest my money elsewhere.

Rog Frost

Sound	6
Graphics	7
Playability	4
Value for money	4
Overall	5

Bargain time in the valley

Program: Twin Kingdom Valley
Price: £2.99.
Supplier: Bug-Byte, Liberty House, 222 Regent Street, London WIR 7DB. Tel: 01-439 0666.

THIS is a graphics adventure with 175 locations each portrayed in full colour. The program is by no means new, in fact it has been around for years, but the novelty lies in the price just £2.99.

In traditional adventure style, you play a treasure seeker, in this case aiming to score 1024 points. Your journey takes you through forests, over and under mountains braving deserts and ravines. You will encounter elves and dwarves, dragons and witches, and droves of rather nasty guards and gorillas.

Twin Kingdom is not one of those adventures where you must spend three weeks pondering how to escape from the first location. In fact about 100 of the sites are easily accessible by the usual direction commands.

You'll have no problem finding the lamp which you will need for the tunnels, or a bag for carrying things. If you do get a bit stuck then typing Help lists all the verbs you can use.

Some of the other travellers you meet are a nuisance, not only to your quest, but also to the smooth flow of the game. Some can be helpful, but if in doubt, check your own strength and indulge in a little violence. The best cures for weakness are waiting around or swimming at Watersmeet.

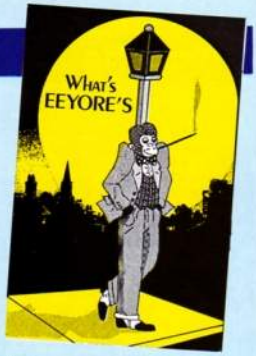
One technical feature of the game is seriously amiss. With a Plus 4 fitted the save game feature doesn't work. The most annoying part is that without a saved position there is no re-start option, so you have to re-load the entire game. Even when it does work, saving a game is a long, long process.

Despite its shortcomings I like this game. It has an interesting atmosphere and is straightforward to map. Twin Kingdom Valley is a real bargain, and is one adventure I am determined to solve.

Rog Frost

Presentation	9
Atmosphere	7
Frustration factor	6
Value for money	10
Overall	9

Now for something different



Program: What's Eeyore's
Price: £5.95
Supplier: Magus, 4 Toronto Close, Durrington, Worthing, West Sussex BN13 2TD. Tel: 0903 67609.

EEYORE'S tail has gone missing again and his mournful looks are making everyone miserable. In desperation, King Golly is offering the hand of his daughter in marriage to the toy that can re-unite Eeyore with his tail. As Joe, one of the GIs (Golly's Infantry) at the palace you decide to try your luck.

If you think this scenario means that the game is for kids, think again, for this is the most ingenious and original adventure that I have seen for a long time.

You begin outside Golly's Palace, near the town of Robard's Sun (get the pun). A quick exploration of your initial surroundings will reveal that most of the locations you visit are made of one or another kind of sweet. I did try to eat my way through, but without much success.

It won't take you long to realise that the problems you find aren't going to be solved by using lateral thinking – as Magus themselves say: "You have to think illogically to get anywhere".

The solution to one obstacle is fairly obvious. To get on to the motorway you will need a car. You'll discover one in Noddy's garage – but you won't find it easy to use.

While the program offers no help other than a list of verbs recognised, there are clues to be found within the game. Waking King Golly will get the response "Golly stirs and mutters . . . the giant's notebook"'. A clue? I'll leave you to find that out for yourself.

The soldier in the Pretty Maid's house will offer to help you if you go and find his musket, fife and drum. I'm still looking.

I have to admit that I am struggling with this adventure. The scenario is so innovative that I am still trying to adjust to it. The adventure is also wickedly funny. Virtually every object, and most of the locations, form the basis for some kind of fun.

An exceptionally good adventure that is ingenious, imaginative and funny. An absolute must.

Paul Gardener

Presentation	5
Atmosphere	10
Frustration factor	9
Value for money	10
Overall	9

New mission for Hanson

Program: Project Thesius
Price: £9.95
Supplier: Robico, 3 Fairland Close, Llantrisant, Mid Glamorgan CF7 8QH. Tel: 0443 227354.

AFTER playing the first Rick Hanson game, I couldn't really see that Robico could improve the quality of their games. I was wrong – they have.

The dossier that comes in the game's packaging outlines Rick's latest mission. The enemy has made a breakthrough in particle beam technology and is building an advanced weapons system using it.

Rick's mission is to discover as much about it as he can, which will require him to get the plans for the system. A submarine drops him at Fisherman's Cove, a secluded spot on the enemy shoreline. The submarine will stay in the area until Rick has finished his mission and will then pick him up.

To help him, various undercover agents in the area have left instructions – some in the form of subtle clues – and others will meet him to aid him in his task.

You start on the beach at Fisherman's Cove. It is very cold and the first thing you should do is find something to help you get dry.

When you do find it, removing your wet clothing first will help and if you wipe the towel rather than yourself you should find that you can start to concentrate on your mission.

Examining the towel will provide a clue, and you should now look for a telephone box. Examining everything when you get there will give you some numbers to try if you go back to the cave and dig.

One of them will provide you with some clothing. A visit back to the telephone box, now that you know which number to use, will allow you to hear a message giving details of the location where you will meet your first contact.

You can ignore the helicopter for the time being, and an examination of your clothing will find you on the outskirts of Winterton, the village where you are to meet your first contact.

While Project Thesius isn't the hardest adventure I've ever played it is the most enjoyable. The location descriptions are full with masses of detail.

A superb game that I can highly recommend.

Paul Gardener

Presentation:	9
Atmosphere:	10
Frustration factor:	8
Value:	10
Overall:	9

Nimble fingers needed

Program: Roboto
Price: £2.99
Supplier: Bug-Byte, Liberty House, 222 Regent Street, London WIR 7DB. Tel: 01-439 0666.

ROBOTO is set in the distant future where a feeble sun shines on a barren Earth. A crumbling power station has developed a serious malfunction which has caused the auto components to run rampage around the complex. Unless you can regain control by de-activating all the zones a major power failure will occur which will wipe out the last remaining life on the planet.

You control a robot, a stick-like object which can float gracefully around the 51 high resolution screens. You can dive, climb, or cling on to vertical walls as you blast the various nasties out of existence.

Each screen contains a power orb. When you destroy one most of the meanies on that screen will stop firing at you, making it much easier to progress to the next zone without losing a life. Additionally, some orbs give extra ammunition, which is particularly useful as it is all too easy to run out completely.

Many of the rooms are real devils to get through first time and require deft use of the control keys which, thankfully, you can redefine.

The program is well written, has no obvious bugs, and follows the now familiar Bug-Byte style of having BBC Micro and Electron versions on opposite sides of the tape.

The graphics are smooth, albeit with a little flicker, and the sound is not too intrusive, but I wish you could turn it off from within the program.

This is an enjoyable game for the nimble fingered, requiring a good memory or a well drawn map. Roboto is well worth adding to your collection.

Rog Frost

Sound	6
Graphics	8
Playability	8
Value for money	9
Overall	8

Big game, foxy puzzles

Program: Enthar Seven
Price: £17.95 (two 40 track discs), £16.95 (one 80 track disc)
Supplier: Robico Software, 3 Fairland Close, Llantrisant, Mid Glamorgan CF7 8QH. Tel: 0443 227354.

FIRST the good news: Enthar Seven is now available for the Electron. Now the bad: Only if you have an AP4 disc interface from Advanced Computer Products or any other DFS compatible with BBC Micro.

I had a slight problem getting started. I happen to like a leisurely beginning to an adventure game, and Enthar Seven doesn't exactly provide it.

I found myself in a planetary orbiter with a rapidly decaying orbit. The warning lights were flashing and I had some tasks to perform in order to get out intact. I tried to begin preliminary exploration, ignoring the problems, and got killed far too often for my peace of mind.

Just before total paranoia set in I thought of trying STAND, and the situation improved a bit – for a while. After I had finally calmed down I got myself out of that dratted orbiter and into the Command Centre. Then the game began in earnest . . .

I for one like the sheer complexity that the program presents. It's a game to load and then spend time with a map considering what item in what level will help you with a problem.

After far too long I discovered that bats intent on killing me didn't need garlic, but something a lot more scientific and logical (and me with a 98 per cent pass mark in a logic exam in the dim and distant past).

There are the obligatory mazes. Though I hate them I must admit I really enjoyed getting the better of that Securibot and the rubbish heap.

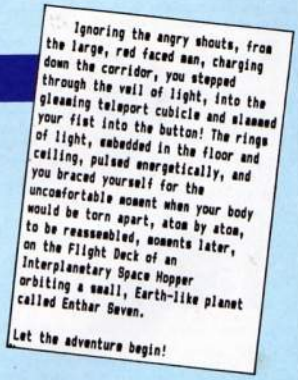
One maze, in the cavern area, had me foxed – it's a twisty affair that normally would be mapped by dropping things. The trouble is that a creature shoots out and gobbles up everything you drop.

The answer to this problem is totally logical and the clue for how to map the maze is clearly supplied in the location descriptions.

Enthar Seven really is a big game with over 450 locations. I have been fried, frustrated, irradiated, and thoroughly put into my place. The puzzles are good, the descriptions and atmosphere superb, the backup help is readily available.

If this standard is maintained Robico is going to be well worth following and I would recommend that you buy all it publishes.

Mad Hatter



Presentation	9
Atmosphere	9
Frustration factor	9
Value for money	9
Overall	9

We are looking for TWO top quality writers. If you are aged 18 or over, own a printer, and would like to review Electron software, please send a sample 400 word review together with a brief CV to: The Reviews Editor, Electron User, 68 Chester Road, Hazel Grove, Stockport SK7 5NY. The successful applicants will be paid at the standard contributors' rate, and will be allowed to keep the software.

MicroLink
in association with
TELECOM GOLD

No. 13 September 1986

NEWSLETTER

Travel talk

ONE of the jewels in the crown of British Rail is the Euston Travel Centre which offers the most comprehensive travel information service imaginable.

Now that mine of information is available to computer owners in their own homes through the medium of MicroLink.

The latest addition to MicroLink's British Rail section is a facility for obtaining information from the Euston Travel Centre by completing a simple electronic request form.

Information requested is swiftly transmitted by return to the subscriber's mailbox – or sent by snail mail if preferred.

The security connection

ALL the many facets of MicroLink's value added services are proving useful to one of the world's most prestigious independent watchdogs on security affairs.

The London-based International Institute for Strategic Studies has for 30 years monitored shifts in the balance of power and in the arms race, and has provided a forum for unbiased discussion of the global strategic situation.

It uses MicroLink's telex facility to keep in touch with its 3,500 members in 80 countries, to correspond with those who have attended its conferences, and to make travel and hotel arrangements for its 35 permanent staff and 12 researchers, as well as for handling membership renewals and ordering publications from around the world.

But the institute also appreciates the more sociable aspects of the services which MicroLink provides.

Says IISS systems manager Helen Rayner: "We find some of the other facilities like FloraLink as useful as, say, the international Official Airlines Guide – and personally I find TheatreLink fascinating for its up-to-date information on the London shows".

... and research

THAT eminent government research establishment the National Physical Laboratory is using MicroLink to move the data it requires for its important research and development projects.

Fast and efficient exchange of information and transmission of documents is achieved through the medium of MicroLink's electronic mail facility.

Thirteen mailboxes have been distributed among the establishment's various divisions, which are mainly involved with high-level physics.

Previously the Laboratory subscribed to the basic Telecom Gold service, but finds MicroLink more economical and has more facilities.

Link with stars

WRITER and photographer David Cotton leads a busy and sometimes glamorous existence as a freelance journalist based on the Continent.

Everywhere he goes on assignment he takes along his portable Brother EP44 typewriter/terminal and acoustic coupler to file his articles using the MicroLink telex service.

"I write my copy on the portable, which has limited word processing facilities for up to about 600 words, then dump it in batches to my mailbox for telex transmission and for further processing later on my BBC Micro when I am back in my office in Holland", says David.

"A lot of my work is for magazines and involves TV and film stars, and I use MicroLink to contact people like these who I need to interview and photograph".

David has a useful tip for globe-trotting, portable-owning MicroLink users: "International travel with a computer can be a disaster.

"The word computer to customs officers is guaranteed to cause all sorts of problems as they try and decide if that Electron you are carrying back for your 7-year-old son is an illegal import full of pirate IBM software.

"I truthfully point out that my machine is nothing more than a typewriter, and hide the acoustic coupler at the bottom of my clothes bag".

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Follow the correct PROCedures for faster programming

PETE BIBBY shows you how procedures can be more useful than subroutines

IF you've followed the last two articles Program I should cause you no problems.

The main part of the program just prompts you for a name, then stores it in the string variable *name$*.

```
10 REM Program I
20 PRINT "What is your n
ame?"
30 INPUT name$
40 GOSUB 60
50 END
60 REM hello subroutine
70 PRINT "Hello ";name$
80 RETURN
```

Program I

Line 40 sends the program off to a subroutine, the lump of code starting at line 60.

This simply gets the micro to say hello and RETURN of line 80 sends it back to line 50. Since this is an END the program does just that. Good stuff, what?

Program II does exactly the same thing, but in a different way. It uses procedures rather than subroutines.

Here the main program is the same except for line 40. This now calls a procedure called PROCname instead of a subroutine.

As soon as the Electron comes across a word beginning PROC it knows that it is to perform a procedure that's defined somewhere in the program.

It then looks for the bits of code that make up the procedure and executes them. As soon as that is done control returns to the next statement.

It's all very reminiscent of subroutines except that now there's no GOSUB or line number, just a procedure name. Doing this is termed a procedure call.

So when the Electron comes to line 40 and finds PROCname it obeys the procedure call. The procedure itself is defined by the lines of code coming between DEF PROCname – line 60 – and ENDPROC – line 80.

You'll remember DEF from our exploration of user-defined functions. It stands for DEFine.

In this case the PROC at the beginning of the procedure name tells the micro that it's a procedure that's being defined, not a function.

All the following lines make up the procedure with the ENDPROC logically enough marking its end. Once a program reaches an ENDPROC it returns to the statement after the one that called it.

You can give your PROC any name you like, but I advise that you make it meaningful. PROCaverage means a lot more to me than PROCa.

Notice that I tend to use lower case letters for the name, just as I do with variables. It all helps make the program easier to read and hence understand.

So to sum up the above a procedure is, at first sight, fairly similar to a subroutine.

When the micro finds a procedure name, such as PROCwhatever, it immediately locates the lines that make up the procedure – marked out by the DEF and ENDPROC – and obeys them.

At the end of the procedure control is returned to the statement following the procedure call.

```
10 REM Program II
20 PRINT "What is your n
ame?"
30 INPUT name$
40 PROCname
50 END
60 DEF PROCname
70 PRINT "Hello ";name$
80 ENDPROC
```

Program II

Again like subroutines procedures can help us create programs that work. Suppose we wanted a program that did some simple number calculations. It's fairly obvious that it divides into three main parts:

```
obtain the numbers
do the calculations
display the results
```

Previously we used subroutines, but now the main body of the program falls naturally into three procedure calls:

```
PROCnumbers
PROCdoCalculations
PROCdisplayResult
```

All you have to do is to write them. And, once more like subroutines, you can use the procedures as stubs, which are dummy pieces of code used to show the overall logical structure of the program. Program III shows the stubs for the above set of procedures.

I don't honestly think there's much point in elaborating on Program III except to say that it's a lot easier to understand than the subroutine-riddled version we had last month.

That's the nice thing about procedures. If you pick meaningful procedure names they help make the program self-documenting and hence easier to follow.

Once we've got the structure sorted out we can just insert the relevant procedures as needed.

In the case of Program IV I've set myself the task of calculating the average of three numbers, so PROCdoCalculations does just that, with the other procedures suitbly altered to allow for this.

Again I don't think I have to elaborate on how it works, it's quite simple. In fact it's too simple as we'll see in a moment. After all, the procedures are only really one line.

```
10 REM Program III
20 PROCnumbers
30 PROCdoCalculations
40 PROCdisplayResult
50 END
60 DEF PROCnumbers
70 PRINT "This bit gets
three numbers"
80 ENDPROC
90 DEF PROCdoCalculation
s
100 PRINT "Now the sums a
re done"
110 ENDPROC
120 DEF PROCdisplayResult
130 PRINT "This shows the
result"
140 ENDPROC
```

Program III

In more advanced programming these procedures will consist of a lot more lines, and they won't just be a simple set of statements one after the other.

There'll be all sorts of loops

▶

From Page 17

and IF statements working together to achieve the purpose of the procedure.

The procedure may even call other procedures from within itself, not unlike the nested subroutines we met last time. Program V shows a trivial example of this.

The main body of the program consists of one procedure call, PROCcallAnother. So when the Electron finds this line it just goes to the place where the procedure is defined and obeys the lines it finds there.

Thus line 50 has it printing a message, while 60 just provides a blank line. Then there's another procedure call, this time to PROCyetAnother. The Electron now goes off in search of that procedure definition and obeys those lines.

The result is that 100 displays the final part of the message and the program moves on to line 110. The ENDPROC here tells the micro that PROCyetAnother has come to an end.

As a result the Electron goes back to the line after the procedure call that invoked PROCyetAnother. This is line 80, which also happens to be an ENDPROC – this time marking the end of PROCcallAnother.

Now control returns to the line after the original procedure call, line 30. As this is an END the procedure grinds to a halt. Figure I shows this diagramatically. Incidentally, try leaving out the END and see what happens.

We can put this ability procedures have of calling other procedures to good use. Program VI, a version of Program IV, is an example.

Here I've decided that all the numbers used in the calculations have to be positive. Because of this I have to have a bit of code to check that this is the case and, if it isn't, do something about it.

Before I even think about what the code is going to be I know that it can be put in a procedure PROCcheck and plugged into the program just after the numbers have been input.

Hence line 90 in PROCnumbers which calls PROCcheck to validate the input, as it's known in polite circles.

The actual code in PROCcheck isn't all that difficult. It's just one IF that checks to see if there is a negative number. If there is it tells you so, and then calls PROCnumber to get three more numbers.

Now this is a bit like pulling yourself up by your bootlaces. Think about it. If you give the program a negative number PROCcheck tells you and calls for PROCnumber which then calls PROCcheck to check them again, and if one or more is negative . . .

Don't worry about it too much, we'll be dealing with it later. However there are two points to be made. With this set up you could carry on forever putting in wrong numbers.

In a working program there would be a limit of some kind. Also PROCcheck rejects all the input numbers, even if only one is wrong. It seems a bit drastic. Can you remedy the situation?

One nice thing about procedures is that once you've got them you can use them all over the place. Take a look at Program VII.

This just takes two numbers and stores their values in the numeric variables *a* and *b*. Then PROCswap is called to ensure that the higher of the two values is stored in *a*, the lower in *b*.

If you're wondering why use the variable *temp* try leaving it out and just having:

```
a=b:b=a
```

after the THEN. Silly isn't it? Yet it's amazing how many times things like that happen

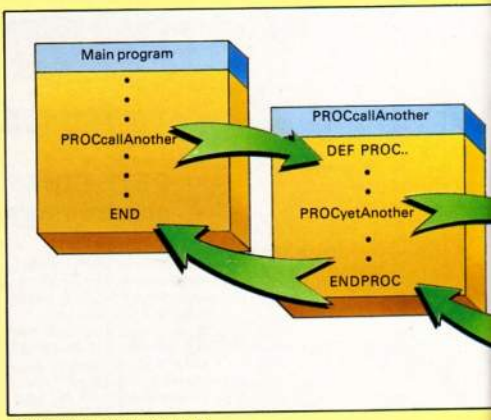


Figure I: Nested procedure calls

```
  10 REM Program IV
  20 PROCnumbers
  30 PROCdoCalculations
  40 PROCdisplayResult
  50 END
  60 DEF PROCnumbers
  70 PRINT "Give me three
numbers"
  80 INPUT first,second,th
ird
  90 ENDPROC
 100 DEF PROCdoCalculation
s
 110 average=(first+second
+third)/3
 120 ENDPROC
 130 DEF PROCdisplayResult
 140 PRINT "The average is
 ";average
 150 ENDPROC
```

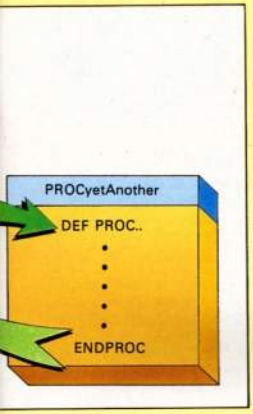
Program IV

```
  10 REM Program V
  20 PROCcallAnother
  30 END
  40 DEF PROCcallAnother
  50 PRINT"All this does i
s to "
  60 PRINT
  70 PROCyetAnother
  80 ENDPROC
  90 DEF PROCyetAnother
 100 PRINT "call another p
rocedure"
 110 ENDPROC
```

Program V

```
  10 REM Program VI
  20 PROCnumbers
  30 PROCdoCalculations
  40 PROCdisplayResult
  50 END
  60 DEF PROCnumbers
  70 PRINT "Give me three
numbers"
  80 INPUT first,second,th
ird
  90 PROCcheck
 100 ENDPROC
 110 DEF PROCdoCalculation
s
 120 average=(first+second
+third)/3
 130 ENDPROC
 140 DEF PROCdisplayResult
 150 PRINT "The average is
 ";average
 160 ENDPROC
 170 DEF PROCcheck
 180 IF first<0 OR second<
0 OR third<0 THEN PRINT "Th
ey've all got
 190 ENDPROC
```

Program VI



Each time round the loop the next value from the data list is read into *b* and then PROCswap is called. The result is that the highest value so far is always held in *a*.

If you can't see how that happens try working through the program line by line, writing down the values of *a* and *b* at each point.

This program trace, though longwinded, is an excellent way of understanding how programs work, and why they sometimes don't.

That's all we're going to cover on procedures this time. As you'll have seen they're very like subroutines, allowing us to program in a modular way.

This has all the benefits of divide-and-conquer top-down programming methods, and makes for easier error detection and correction.

Also, as in the last two listings, a procedure written for one program can be used in another to good effect.

Having said all that, procedures can do a lot more than subroutines.

For a start they're faster, and they also make the program easier to understand. The other benefits we're coming to next month.

For the meantime just think about this – suppose that we'd decided to use the PROCswap from Program VII in Program VIII but we'd used different variable names in the main program, say *first* and *second*.

```
  10 REM Program VIII
  20 READ a
  30 FOR loop=1 TO 4
  40 READ b
  50 PROCswap
  60 NEXT loop
  70 PRINT "The maximum is
"ja
  80 DATA 1,7,-3,41,5
  90 END
 100 DEF PROCswap
 110 IF b>a THEN temp=a:a=
b:b=temp
 120 ENDPROC
```

Program VIII

It would be a bind wouldn't it?

● *More on that next month as we proceed further.*

in people's programs.

Now for two numbers using PROCswap is a bit silly. But suppose you had a huge list of numbers and had to find the maximum.

It might be quicker to get your Electron to do it for you, and PROCswap would be just the job as our final listing, Program VIII, shows.

Here, for simplicity, the program has to find the highest value of five numbers held in the DATA line, line 80.

```
  10 REM Program VII
  20 PRINT "Give me two nu
mbers"
  30 INPUT a,b
  40 PROCswap
  50 PRINT "The largest is
 "ja
  60 END
  70 DEF PROCswap
  80 IF b>a THEN temp=a:a=
b:b=temp
  90 ENDPROC
```

Program VII

The first number is read into *a* – this is known as a priming read, as it sets things up – and then the program enters the FOR . . . NEXT loop of lines 30 to 60.

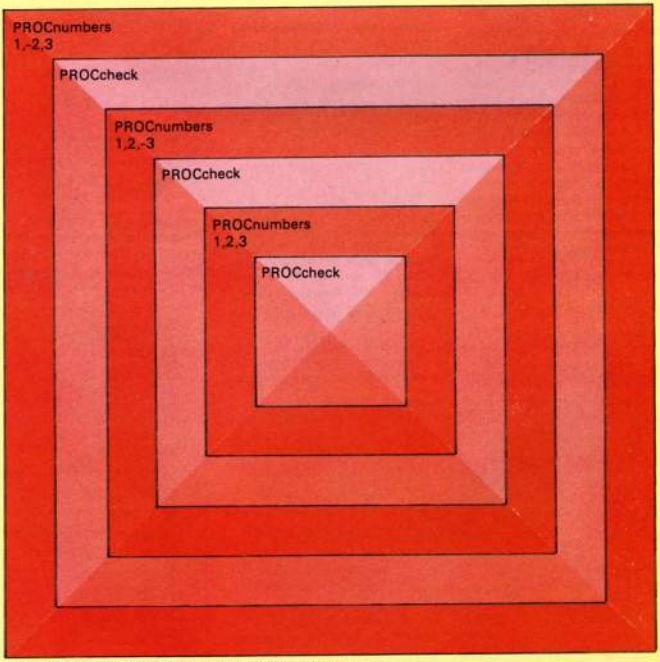


Figure II: Procedures calling procedures calling procedures . . .

MAKING FACES AT THE WINDOW

Part seven of the Electron graphics series by TREVOR ROBERTS

WE have already explored the Electron's screen display and found that what we saw as just a single screen was really two – the text screen and the graphics screen.

At power-up or after a mode change these screens overlap. We found that we could do something about this with a VDU 28 command. This takes the form:

```
VDU 28,bottomx,bottomy,
topx,topy
```

and defines a rectangular part of the screen. From here onwards all text to be printed will be confined inside the boundaries of the text window defined by the VDU 28 until a Break, mode change or another VDU 28.

To remind yourself of the difference between the two types of window put the Electron into a graphics mode with, say:

```
MODE 1
```

and set up a text window with:

```
VDU 28,4,30,28,4
```

Remember that the co-ordinates of the bottom left and top right corners of the screen are measured in terms of characters and lines, just like when we use TAB.

The top left corner of the text screen is originally – before any VDU 28s get at it – 0,0. Now use:

```
COLOUR 129
```

and:

```
GCOL 0,130
```

to set the background colours of the text and graphics screens. You will then see the red text and yellow graphics backgrounds when you enter:

```
CLS
```

and:

```
CLG
```

respectively. When you want things to go back to normal just type in:

```
VDU 26
GCOL 0,128
COLOUR 128
CLS
```

No doubt you'll recall that VDU 26 makes both text and graphics screens overlap, filling the whole screen.

Staying in Mode 1 with the original screens restored by VDU 26 let's look at the effects a text window has on the way TAB works. Enter:

```
PRINT TAB(3,3)"*"
```

and you'll see an asterisk appear four lines down from the top of the screen and four character spaces in from the left.

If you're wondering why there aren't three of each instead of four remember that the Electron starts counting at zero. The top line is line 0, and the far left character position on a line is character position 0.

Now suppose we create a text window with, maybe:

```
VDU 28,5,20,25,5
```

What happens now if we use:

```
PRINT TAB(3,3)"*"
```

in our relentless attempt to fill the screen with asterisks? The answer is, like most things when learning about micros, try it and see. You'll find that the TAB command treats the top left of the text window as position 0,0 and measures from there.

Figure 1 shows how it's positioned. Try a few more TABs for good measure, such as:

```
PRINT TAB(7,14)"*"
PRINT TAB(12,3)"*"
```

and try and explain what's happening.

Notice how the window scrolls when it's full. Also see what happens if you give the micro silly values that take it outside the text window, such as:

```
PRINT TAB(30,7)"*"
PRINT TAB(10,55)"*"
```

In the first case the TAB just wraps around until the appropriate number of character

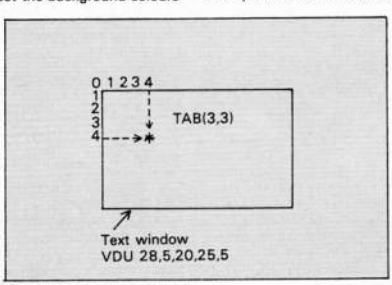


Figure I: Text windows and TAB

```
 10 REM Program 1
 20 MODE 2
 30 VDU 23,1,0;0;0;0;
 40 VDU 28,5,18,14,2
 50 COLOUR 132:CLS
 60 REM MOUTH
 70 VDU 28,8,16,11,15
 80 COLOUR 133:CLS
 90 PROCname("mouth")
100 REM NOSE
110 VDU 28,9,13,10,5
120 COLOUR 129:CLS
130 PROCname("nose")
140 REM LEFT EYE
150 VDU 28,6,11,7,8
160 COLOUR 130:CLS
170 PROCname("eye")
180 REM RIGHT EYE
190 VDU 28,12,11,13,8
200 COLOUR 130:CLS
210 PROCname("eye")
220 VDU 26:COLOUR 7: COLO
UR 128:CLS
230 END
240 DEF PROCname(name$)
250 VDU 28,6,23,13,21
260 COLOUR 3:COLOUR 128
270 CLS
280 VDU 7
290 PRINT TAB(2,1) name$
300 wait$=GET$
310 ENDPROC
```

spaces has been used.

In the second it gives up. You just get an asterisk sitting sullenly at the beginning of the next line waiting for you to get your TAB right.

You can have some good fun drawing with text windows, even though you're limited to rectangular blocks. Program I shows how to draw a very simple face.

By now your expertise with text windows should be such that the program holds few, if any, mysteries.

The first three lines just label the listing, put the Electron into Mode 2 and switch off the flashing text cursor – we don't bother switching off the graphics cursor as it's invisible.

The main action starts with line 40 which uses VDU 28 to make a text window. Line 50 sets the background colour of this text window to blue and then clears it. The result is a large rectangle on the screen, which is the basis of the face.

Drawing the mouth – or rectangle that purports to be a mouth – comes next. Again a text screen is created, and this time cleared to a different colour – magenta. Then PROCname is invoked.

A quick glance at lines 240 to 310, where the procedure is defined, should show you what it does.

It creates yet another text window, this time below the original blue window. It then takes the string passed as a parameter from the procedure call and displays it in the lower window. It also beeps – VDU 7 – and waits for a key to be pressed before carrying on.

So the program proceeds, drawing two eyes and a nose before a final keypress restores the normal screens and colours.

After you've been stunned by the magnificence of the screen display you might decide to improve the program. It could certainly do with it. How about eyebrows, ears and pupils for the eyes?

And couldn't you just use one window-creating procedure and pass it the parameters for the window's corners and its colour? Have a go. When you've finished that we'll go on to another kind of window.

It shouldn't be hard to guess that these are graphics windows. We define them in a way that looks similar to the way we define text windows, but there are certain differences.

With graphics windows we use a VDU command, but this time it's VDU 24. And while the numbers following the VDU 24 refer to the bottom left and top right corners of the graphics screen the numbers are graphics coordinates, not text coordinates.

As usual they're measured from the bottom left corner of the display. A final point to note is that the punctuation of a VDU 24 is very different from that of a VDU 28. The format is:

```
VDU 24,bottomx;bottomy;
topx;topy;
```

After the comma following the 24 the other numbers have semicolons coming after them. Even the last number has a trailing semicolon. Make sure you get it right as wrong punctuation in a VDU command can have weird results.

Bearing that warning in mind let's have a look at a couple of graphic windows. First put the micro into Mode 1 with:

```
MODE 1
```

and then create a graphics window with:

```
VDU 24,300;400;900;700;
```

This defines the inner of the two graphics windows shown in Figure III.

Prove to yourself that there is a window there by using:

```
DRAW 1279,1023
```

From our past experience we know that this should result in a line across the whole screen from the bottom left corner to the top right.

However now all we see on screen is the part of the line that lies within the graphics window – when you define a graphics window you only see the graphics that occur inside it. Anything else is ignored.

Crafty readers may wonder what would happen if we enlarged the window with a:

```
VDU 24,200;300;1000;800;
```

This results in a second window that completely surrounds the first – the outer window in Figure III. Does the missing part of the line appear? Try it and see.

The answer is that it doesn't. If you want to recreate the missing bit put the graphics cursor back to the graphics origin with:

```
MOVE 0,0
```

and then:

```
DRAW 1279,1023
```

which results in the wanted line.

One final point to notice is that whatever the graphics window the graphics coordinate system refers to the whole screen.

The bottom left of the display stays as 0,0 whatever section of the screen is partitioned off for a graphics screen. This is another important difference from the text screens.

● *On that note we'll leave it for now. Next month we'll be looking at graphics coordinates in a little more depth. In the meantime have a look through some windows and see what you can see.*

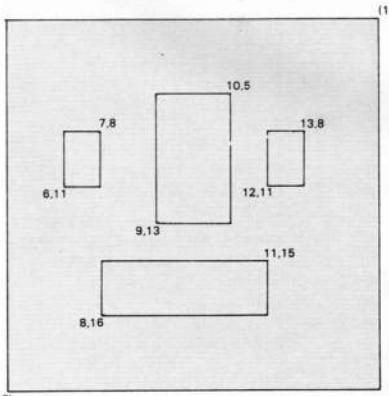


Figure II: The face – text window coordinates

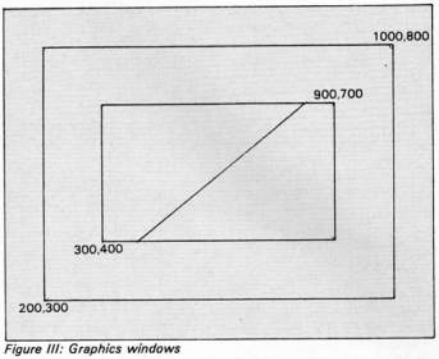


Figure III: Graphics windows

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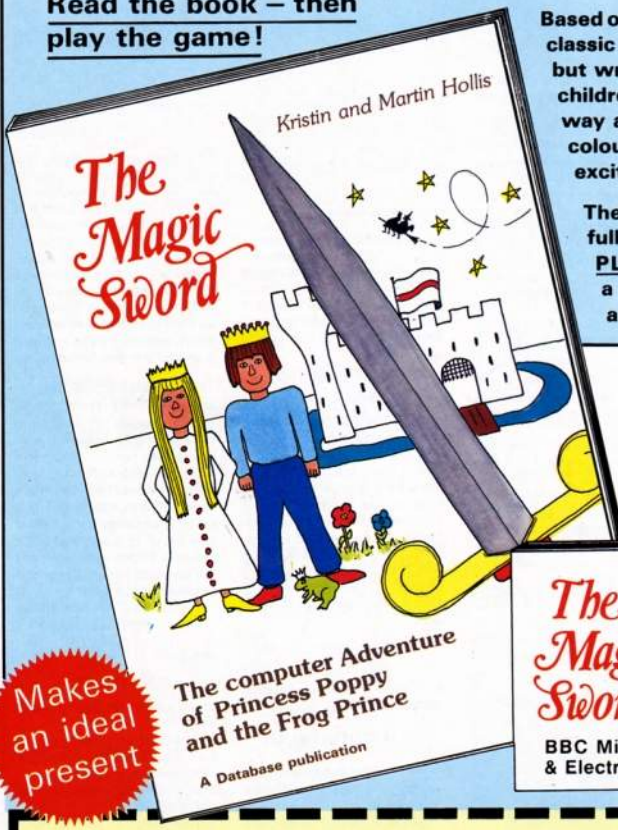

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TAME YOUR PROBLEM PROGRAMS

ALAN McLACHLAN shows how to find the typing mistakes that produce those dreaded error messages

SOME time ago I introduced you, tongue in cheek, to the host of people who write to us with programs that they have typed in and cannot get to run. (By the way I forgot to mention the hairdresser . . . "I've been through it with a fine tooth comb".)

Inevitably these people have made typing errors and some actually admit it, although these are a rare breed.

In the same article I promised you some useful hints to help get your sick programs back on their feet again, and I'm going to make a start now.

I make no apologies for re-emphasising that the main reason for the majority of your typed-in programs not running is that somewhere you have made a mistake.

No, not in buying your micro in the first place, although you may feel like chucking it through the window sometimes!

You have either mistyped or omitted some item, or have inserted something in the program that is not only not required, but whose presence is fouling it up.

These typing errors are certainly responsible for the variety of error messages that will greet you, ranging from a simple "Syntax error" to the heart-stopping "Subscript". No, I don't relish this second one either.

Preventing the typing errors rather than curing the results would seem to be the ideal solution. It should be easy enough.

Type in the listings slowly, carefully, checking each line once it has been entered. You can even move the cursor across the line to highlight each letter or to count each data entry as each line is finished.

Tedious? Dead right, but I've done it on many occasions in my early days in computing, and although I was fed up to the back teeth, my programs worked. Believe me, that makes up for all the tedium.

But, quite naturally, people get impatient and prefer to crash on regardless in a rush to get the tedious part finished. Then they start looking for errors when RUN doesn't work.

If this is the way you prefer to do it, we must look at some ways to make those errors easier to find.

It is important if you are going to really enjoy your new hobby that very early on you become reasonably proficient at picking your way through a listing by just reading it. In fact it is imperative if you want to be able to debug your own programs.

It's as important as a musician being able to read music without actually playing it on an instrument.

This is why we attach so much importance to REM statements in our magazine listings. They are there for your benefit as well as ours.

We insist that our games writers use lots of them to show the program's stucture. Also we ask them to give us lists of procedures and variables to enable you to find your way around the program.

Finding out why your instructions are not working correctly, or why your little green man will move left but not right, is easier if you can identify the appropriate procedure. Read through the listing and try and make some sense of what's going on.

Just in case you missed my first article (there must be at least one of you) here's a repeat of a simple debugging hint that should make your errors easier to identify.

Let's assume you've typed in Manic Mole from the July 1985 issue, and instead of the correct version of line 1680 which reads:

```
1680 PRINTTAB(15,29)"Press
SPACE":REPEATUNTILGET=32:
CLS
```

you have incorrectly typed in:

```
1680 PRINTTAB (15,29)"Press
SPACE":REPEATUNTILGET=32:
CLS
```

Your micro will respond with the message "No such variable at line 1680". It's seen TAB (15,29) and taken the TAB as an undefined variable. The space is the problem, it should be omitted from the statement.

But what if there were more statements in the line and the error was not quite so obvious? A simple hint is to split the line at one of the colons.

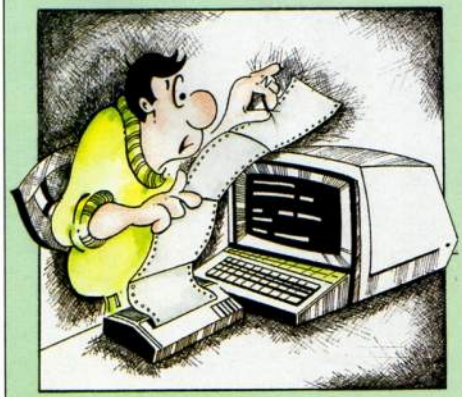
We'll split it at the second, but on a longer line you would find it better to split it near the middle. Put the Basic statements in the second half of the line, on a separate line as follows:

```
1680 PRINTTAB (15,29)"Press
SPACE":REPEATUNTILGET=32
1685 CLS
```

You will still get the error message "No such variable at line 1680". Now split the line and make a new one from the second half and you will have:

```
1680 PRINTTAB (15,29)"Press
SPACE"
1681 REPEATUNTILGET=32
1685 CLS
```

The resulting error message



'Type in the listings slowly and carefully'

From Page 23

will still be the same, but look how we've narrowed it down to just a few characters.

In fact, apart from in just one set of circumstances – where the colon comes after an IF statement – you can split any line you want at any colon, and make as many extra lines as the program will allow you.

Gradual elimination will narrow down the alternatives until you are left with the offending statement on its own.

Your micro can't tell you what's wrong with it, but with careful checking and perhaps experiment you should come up with the solution.

Another important aid to debugging is to make sure that your micro's error trapping routine actually reports errors.

This may sound strange, but it could be that the program writer has done something crafty with the ON ERROR command. Quite often they will use the commands like:

or:

```
ON ERROR PROCinstructions
```

which, although useful ways of disabling the Escape key when tidying up a finished product, aren't much use to you when you are either trying to get the program to tell you what's wrong with it, or simply trying to get into it to work on it.

'What you need is something simple which will report exactly what kind of error you have made'

It is a simple matter to replace the program's existing on ON ERROR statement with a routine of your own.

What you need is something simple that will report exactly what kind of error you've made on a screen uncluttered by other material such as coloured backgrounds or characters.

It is even possible that the program is already reporting your error, but you can't see the message because it is displaying it on the screen in the background colour.

The following short routine placed as the first line of your program will ensure that as soon as an error is encountered your screen is cleared, a simple error message is displayed and the program stops ready for you to start work on it.

```
ON ERROR MODE6: REPORT:
PRINT" at line ";ERL : END
```

There are a couple of other useful techniques that will help you keep track of where your program is going or where it has got to. The first is the use of the command STOP.

By inserting it at a strategic point in your listing you can check to see if the program is working correctly.

When it encounters STOP your program will halt with a message "STOP at line XXX" when it reaches XXX, the line you've chosen to insert the command.

If all is well, you know the error is beyond this point in the program. If, however, all is not well – perhaps it hasn't even stopped – you'll have to backtrack from this line to see what's amiss.

This is extremely helpful in identifying a line which may be putting something on the screen incorrectly.

This technique is ideal for sorting out any graphics errors that may have crept into your listing. You can spot them most of the time by the way the screen looks.

Let's assume you have a character on the screen that should be a man and in fact it has the appearance of nothing more than a shapeless splodge. It's time for a STOP!

No one can teach you exactly where to put the command, it's more of an art than a science.

If, however, you've followed my advice and worked out which way the program's going from the REM statements and accompanying notes, you'll know roughly where it should go.

In this case once you've established the correct place, the line before the STOP may contain the statement:

```
PRINT CHR$(243)
```

This in turn should point you to the line, or at least the procedure, which creates CHR$ (243), using the VDU command.

You have probably entered the data incorrectly at this point in the program.

Another useful tip is the use of the beep produced by:

```
PRINT CHR$(7)
```

or

```
VDU 7
```

This command, correctly inserted, can tell you whether a particular part of the program is being reached or not. It can also indicate how many times you have been through a loop if there is any doubt at all.

This is particularly useful if you are completely in the dark as to where your program is going. You can hear the beep and you know which line you put it in.

Armed with these three hints you should be able to make some inroads into that program that just refuses to budge. You may not know *what* your error is until you check the listing but at least you'll know *where* to look.

I think that's enough to be going on with for this month. Even if you only get one of your poorly programs working, the effort will have been worthwhile. See you soon.

'Another useful tip is the use of the Beep'

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Draw Writer

Expand your Electron's graphics capabilities

By KEN GOODACRE

I WROTE this program initially to help me design a complex graphics screen.

The first version simply listed the X and Y coordinates of the various points on the screen that the lines were drawn to and from.

Then I thought it would be useful if I could save this data instead of writing it all down. Draw Writer was a development of this.

Many graphics programs have been written where a screen can be designed and then stored by saving the whole of the screen memory.

However when loaded back into the Electron the screen cannot be listed in the form of a Basic program. This can be a problem where it may be only one of several screens the program will use.

There may also be a need to switch between each screen, as required by a graphic adventure game. Also if you send a listing to *Electron User* the graphics have to be listable.

Draw Writer will enable you to design a screen using up to 180 plots. It will then write a Basic program which can be *SPOOLed to tape or disc along with all the data to draw the screen. Included in this program will be a call to draw the first screen.

You retrieve the procedures by *EXECing each *SPOOLed part back into the computer. In this way you can expand the program at any time. As the program is rather tight on memory so don't add any extra spaces or over copy any lines.

However if problems do arise due to lack of room you could reduce the size of the main arrays by changing *K*% in line 90 to, say, 170 instead of 180. In addition, Plus 3 owners must *MOUNT the disc before running the program.

The options include polygons from 3 to 60 sided, filled or not and a facility to copy the last polygon in any of the four colours, filled or not.

There is also a facility to draw spokes either to the centre of the polygon, to a point anywhere else on the screen or round the circumference of another polygon.

Similarly a solid polygon can be stretched anywhere on the screen or into another polygon.

You can draw dotted lines, solid lines, single dots and fill between the last two points to create a triangle.

You can move the cursor at various preset angles up, down, left and right. The angle together with the number of moves made is shown in a window at the top left hand side of the screen.

Its colour matches the current graphics pen. You can

PROCEDURES

fill	Fills a triangle.
draw	Redraws screen.
erase	Erases last plot in drawing mode.
poly	Draws a polygon.
spool	Writes program and saves data.
empty	Clears all arrays when screen has been saved.
err	Error trap.
swap	Window swap.
init	Initialises variables and sets up arrays.

CURSOR MOVEMENT

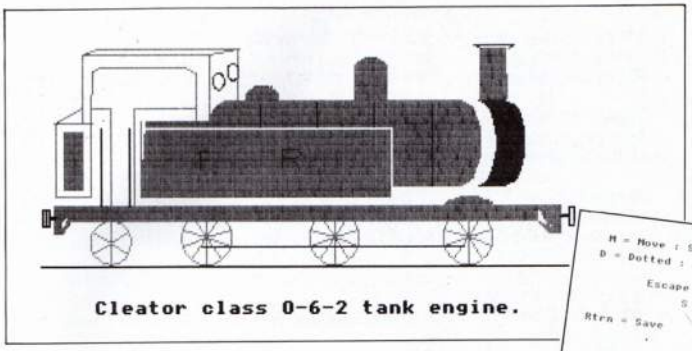
>	Right.
<	Left.
A	Up.
Z	Down.
S	Up/left.
•	Up/right.
X	Down/right.
?	Down/left.
1 to 5	Angle of up/left.
C	Coarse cursor movement.
F	Fine cursor movement.

DRAWING COMMANDS

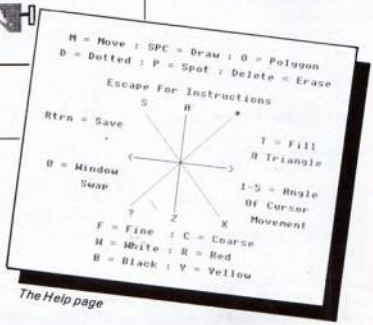
M	Move to and fix a point.
Space	Draw a line from last position.
T	Fill a triangle between last two points plotted.
D	Draw a dotted line from last position.
P	Plot a point at current cursor position.
D	Delete the last line or figure drawn.
O	Enter polygon routine.
Q	Move the window from top to bottom.
W	White pen.
R	Red pen.
B	Black pen.
Y	Yellow pen.

MAIN VARIABLES

a%	Cursor angle.
C%	Graphics pen colour.
I%,J%	Angle of cursor movement.
K%	Number of elements in main arrays.
mode%	The mode in which the saved screen will be drawn.
N%	Line numbers of SPOOLed program.
q%	Number of moves in array.
S%	Speed of cursor.
X%,Y%	Current position of cursor.
x%,y%	Last position of cursor.



Cleator class 0-6-2 tank engine.



The Help page

change its position if it obscures the drawing.

When saving the screen the program asks you which mode you want the screen to be drawn in when you load and run the subsequent program created by Draw Writer.

You can in fact choose any graphics mode but if you want to run in a two colour mode only use black or white when drawing the screen.

To draw a polygon press O, key in the number of sides and press Return. If the number of sides will not divide equally into 60 they will be rounded down until this is achieved.

You will be asked whether your polygon is to be filled or if spokes are to be drawn.

If the answer to either of these is yes you will be asked if it is to be drawn offset to the previous figure or point.

You will now be asked whether the sides are equal. If they are only the X or Y dimension will be required. This is useful for drawing the polygon up to any other point on the screen.

If the X size is to be given simply move the cursor either left or right using the < > keys until the required radius is reached, then press the X key.

If the Y size is to be given first press X without moving sideways and move the cursor either up or down using the A and Z keys until the required radius is reached, then press the Y key. A regular polygon will then be drawn.

If the polygon to be drawn is elliptical both the X and Y sizes will have to be dimensioned.

If you have already drawn a polygon previously you will be asked whether or not you wish to copy it. Copying will give the same X and Y dimensions as the last polygon drawn.

On the first run you will be asked for the start line number, the mode you wish to run the program in and whether you wish to save the main program.

This is in case you have already been working on a program and wish to merge the data only with a program already on tape or disc.

If the main program is not saved and the data is to be merged with an existing one already on tape or disc you must take care to ensure that the line numbers do not clash.

On subsequent runs it will be assumed that only the data will be required and the line numbers will follow on in increments of 10.

After saving a screen you will be asked if you wish to leave the previous drawing on the screen for reference while working on the next one.

If this is done any option that involves wiping the screen, for instance Delete or Escape to the instructions, will remove the previous drawing from the screen permanently.

This is because the arrays are emptied before a new screen is created to allow room for the next one to be stored.

```
  10 REM   * PROCdraw *
  20 REM A Drawing Utility
  30 REM By Ken Goodacre
  40 REM (c) Electron User
  50 *FX200,1
  60  ON ERROR CLS:GOTO281
0
  70 MODE6:VDU23,1;0;0;0;0
;
  80 PRINTTAB(14,10)"Pleas
e wait"
  90 K%=180:PROCinit
 100 *FX200,1
 110 MODE4:VDU23,1;0;0;0;0
;19,1,3,0,0,0
 120 PRINTTAB(2,1)"M = Mov
e : SPC = Draw : O = Polygo
n"TAB(1,3)"D = Dotted : P =
 Spot : Delete = Erase"TAB(
8,6)"Escape For Instruction
s"
 130 PRINTTAB(30,11)"T = F
ill"TAB(29,13)"A Triangle"T
AB(28,17)"1-5 = Angle"TAB(2
9,19)"Of Cursor"TAB(30,21)"
Movement"
 140 PRINTTAB(0,11)"Rtrn =
 Save"TAB(1,17)"Q = Window"
TAB(6,19)"Swap"
 150 PRINTTAB(9,24)"F = Fi
ne  : C = Coarse"TAB(9,26)"
W = White : R = Red"TAB(9,2
8)"B = Black : Y = Yellow"
 160 PRINTTAB(13,8)"S"SPC5
"A"SPC6"*"TAB(12,15)"<"TAB(
26,15)">"TAB(13,22)"?"SPC5"
Z"SPC6"X"
 170 MOVE440,715:DRAW820,3
35:MOVE820,730:DRAW425,335
 180 MOVE415,530:DRAW830,5
30:MOVE620,330:DRAW620,725
 190 PRINTTAB(14,30)"Press
 Shift"
 200 REPEAT UNTIL INKEY-1
 210 MODE5:VDU5:VDU23,1;0;
0;0;0;
 220 *FX200,0
 230 IFOX=1PROCempty ELSE
PROCdraw(qX)
 240 PROCan(8.6,8.6)
 250 IFOX>0 GOTO 570
 260 *FX21
 270 REPEAT:G$=INKEY$(0)
 280 IFG$="O"ORG$="o"OX=5:
Jiffy=SX:PROCstore(4)
 290 IFINKEY-17PROCswap
```

From Page 29

```
  300 IFINKEY-36ANDfI%=1PRO
Cfill
  310 IFINKEY-68SX=5:PROCan
(i,j)
  320 IFINKEY-83SX=20:PROCa
n(i,j)
  330 IFINKEY-49PROCan(0.2,
1)
  340 IFINKEY-50PROCan(0.4,
0.8)
  350 IFINKEY-18PROCan(0.6,
0.6)
  360 IFINKEY-19PROCan(0.8,
0.4)
  370 IFINKEY-20PROCan(1,0.
2)
  380 IFINKEY-104fI%=1:PROC
r
  390 IFINKEY-103fI%=1:PROC
l
  400 IFINKEY-66fI%=1:PROCu
  410 IFINKEY-98fI%=1:PROCd
  420 IFINKEY-90PROCerase
  430 IFINKEY-73fI%=1:PROCu
r
  440 IFINKEY-105fI%=1:PROC
dl
  450 IFINKEY-82fI%=1:PROCu
l
  460 IFINKEY-67fI%=1:PROCd
r
  470 IFINKEY-101CX=0:PROCw
nd1
  480 IFINKEY-52CX=1:PROCwn
d1
  490 IFINKEY-69CX=2:PROCwn
d1
  500 IFINKEY-34CX=3:PROCwn
d1
  510 IFINKEY-74ANDqX>0OX=1
  520 IFINKEY-99ANDfI%=1PRO
Cstore(5)
  530 IFINKEY-102ANDfI%=1PR
OCstore(4)
  540 IFINKEY-51ANDfI%=1PRO
Cstore(21)
  550 IFINKEY-56ANDfI%=1PRO
Cstore(69)
  560 UNTILOX>0
  570 IFOX=1ORQX=2THEN*FX20
0,1
  580 IFOX=1MODE6:PROCspool
:GOTO210
  590 IFOX=2MODE6:PRINTTAB(
0,7)"The array's are now fu
ll!":PROCspool:GOTO210
  600 IFOX=5PROCshape:GOTO2
60
  610 END
  620 DEFPROCr:PROCcur
  630 XX=XX+SX:IFXX)=1279XX
=1279
  640 PROCcur:ENDPROC
  650 DEFPROC1:PROCcur
  660 XX=XX-SX:IFXX(=0XX=0
  670 PROCcur:ENDPROC
  680 DEFPROCu:PROCcur
  690 YX=YX+SX:IFYX)=1023YX
=1023
  700 PROCcur:ENDPROC
  710 DEFPROCd:PROCcur
  720 YX=YX-SX:IFYX(=0YX=0
  730 PROCcur:ENDPROC
  740 DEFPRDCur:PROCcur
  750 XX=XX+JX:IFXX)=1279XX
=1279
  760 YX=YX+IX:IFYX)=1023YX
=1023
  770 PROCcur:ENDPROC
  780 DEFPROCd1:PROCcur
  790 XX=XX-JX:IFXX(=0XX=0
  800 YX=YX-IX:IFYX(=0YX=0
  810 PROCcur:ENDPROC
  820 DEFPROCu1:PROCcur
  830 XX=XX-JX:IFXX(=0XX=0
  840 YX=YX+IX:IFYX)=1023YX
=1023
  850 PROCcur:ENDPROC
  860 DEFPROCdr:PROCcur
  870 XX=XX+JX:IFXX)=1279XX
=1279
  880 YX=YX-IX:IFYX(=0YX=0
  890 PROCcur:ENDPROC
  900 DEFPROCcur:MOVEXX-32,
YX+12
  910 VDU227:ENDPROC
  920 DEFPROCstore(plotX)
  930 IFplotX=856GOTO960
  940 PROCcur:GCOL0,CX:MOVE
xX,yX
  950 PLOTplotX,XX,YX:GCOL3
,3:PROCcur
  960 IFqX=KXOX=2:ENDPROC
  970 qX=qX+1:pX(qX)=plotX
  980 xX(qX)=XX:yX(qX)=YX:c
X(qX)=CX
  990 PROCwnd1:fI%=0:xX=XX:
yX=YX
 1000 IFOX=0PROCw(30)
 1010 ENDPROC
 1020 DEFPROCfill:IFqX(1END
PROC
 1030 PROCcur:GCOL0,CX
 1040 FORA=qX-1TOqX:MOVExX(
A),yX(A):NEXT
 1050 PLOT85,XX,YX:GCOL3,3:
PROCcur
 1060 PROCstore(85):ENDPROC
 1070 DEFPROCdraw(pX):VDU26
,4:COLOUR128
 1080 CLS:FORAX=0TOqX:GCOL0
,cX(AX)
 1090 IFfX(AX)>0PROCpoly(AX
):GOTO1110
 1100 PLOTpX(AX),xX(AX),yX(
AX)
 1110 NEXT
 1120 XX=xX(pX):YX=yX(pX):G
COL3,3
 1130 VDU5:PROCcur:ENDPROC
 1140 DEFPROCwnd1:IFtX=1VDU
28,11,30,18,29ELSEVDU28,1,2
,8,1
 1150 VDU4:COLOUR128+CX:CLS
 1160 IFCX=0ORCX=1COLOUR3EL
SE COLOUR0
 1170 PRINTa%CHR$226":"q%:V
DU5:ENDPROC
 1180 DEFPROCerase:IFqX=0EN
DPROC
 1190 pX(qX)=0:xX(qX)=0:yX(
qX)=0
 1200 cX(qX)=0:cxX(qX)=0:cy
X(qX)=0
 1210 fX(qX)=0:sX(qX)=0:qX=
qX-1
 1220 PROCdraw(qX):PROCwnd1
:ENDPROC
 1230 DEFPROCshape:fiX=1
 1240 IFqX=KXOX=2:ENDPROC
 1250 VDU4:CLS:INPUT"Sides?
"sides%:SX=5
 1260 IFsidesX(3ORsidesX)60
GOTO1250
 1270 polyX=60DIVsidesX
 1280 IF60MODpolyX)0sidesX=
sidesX-1:GOTO1270
 1290 CLS:PRINT"Fill?":PROC
ask
 1300 IFflagX=1fiX=2:GOTO13
30
 1310 PRINT"Spokes?":PROCas
k
 1320 IFflagX=1fiX=3ELSE135
0
 1330 PRINT"OffSet?":PROCas
k
 1340 IFflagX=1fiX=fiX+10
 1350 flagX=0:PROCcopy
 1360 IFf3X=1PRINT"Copy?":P
ROCask
 1370 IFflagX=1PRINT"Drawin
g":GOTO1590
 1380 PRINT"Equal?":PROCask
 1390 eqX=flagX:PRINT"X Siz
e?"
 1400 IcX=XX:YcX=YX:VDU5:GC
OL3,1
 1410 PROCcur:GCOL3,3:REPEA
T
 1420 IFINKEY-104PROCr
 1430 PROCw(1)
 1440 IFINKEY-103PROCl
 1450 UNTIL INKEY-67:XizeX=
ABS(XX-IcX)
 1460 PROCcur:XX=IcX:YX=YcX
 1470 PROCcur:YizeX=XizeX
 1480 IFXizeX=0GOTO1500
 1490 IFeqX=1GOTO1570
 1500 VDU4:CLS:PRINT"Y Size
?"
 1510 VDU5:REPEAT
 1520 IFINKEY-66PROCu
 1530 PROCw(1)
 1540 IFINKEY-98PROCd
 1550 UNTIL INKEY-69:YizeX=
ABS(YX-YcX)
 1560 IFeqX=1XizeX=YizeX
 1570 PROCcur:XX=IcX:YX=YcX
:PROCcur
 1580 GCOL3,1:PROCcur:GCOL3
,3
 1590 VDU5:fX(qX)=fiX
 1600 cxX(qX)=XizeX:cyX(qX)
=YizeX
 1610 sX(qX)=polyX:PROCcur
 1620 SX=Jiffy:PROCpoly(qX)
 1630 PROCcur:OX=0:PROCwnd1
:ENDPROC
 1640 DEFPROCpoly(eX):GCOL0
,cX(eX)
 1650 fX=fX(eX):IFfX)3oX=1E
LSEoX=0
 1660 IFfX)3fX=fX-10
 1670 IFfX=3enX=59ELSEenX=6
0
 1680 MOVExX(eX),yX(eX)+cyX
(eX)
 1690 FORBX=0TOenXSTEPsX(eX
)
 1700 CxX=xX(eX)+cxX(eX)*x(
BX)
```

```
1710 CyX=yX(eX)+cyX(eX)*y(
BX)
1720 IFoX=1ANDfX=2ANDBX=0M
OVECxX,CyX
1730 IFoX=1GOTO1750
1740 IFfX=2ORfX=3MOVExX(eX
),yX(eX)
1750 IFfX=2PLOT85,CxX,CyX
1760 IFoX=1ANDfX<>2MOVECxX
,CyX
1770 IFfX=1ORfX=3DRAWCxX,C
yX
1780 IFoX=0GOTO1830
1790 CxX=xX(eX-1)+cxX(eX-1
)*x(BX)
1800 CyX=yX(eX-1)+cyX(eX-1
)*y(BX)
1810 IFfX<>2DRAWCxX,CyX
1820 IFfX=2PLOT85,CxX,CyX
1830 NEXT:GCOL3,3:MOVExX(e
X),yX(eX)
1840 ENDPROC
1850 DEFPROCask:PROCw(40):
*FX21
1860 G$=INKEY$(0)
1870 IFG$="Y"ORG$="y"CLS:f
lagX=1:ENDPROC
1880 IFG$="N"ORG$="n"CLS:f
lagX=0:ENDPROC
1890 GOTO1860:ENDPROC
1900 DEFPROCspool:OX=1:*FX
202,48
1910 PRINTTAB(3,9)"Have yo
u finished with this screen
","TAB(10,11)"and wish to sa
ve it?"TAB(16,13)"Yes/No?":
PROCask
1920 IFflagX=1THEN1930ELSE
OX=0:ENDPROC
1930 CLS:INPUTTAB(6,8)"Nam
e Of Procedure?"S$:CLS:IFLE
NS$<1ORLENS$>7GOTO1930
1940 IFnewX=1GOTO2000
1950 CLS:INPUTTAB(6,8)"Fir
st Line Number?"NX:CLS:IFNX
<0ORNX>30000GOTO1950
1960 PRINTTAB(2,8)"Do you
wish to save the main progr
am"TAB(9,10)"as well as the
data?"TAB(16,12)"Yes/No?":
PROCask
1970 IFflagX=0newX=1:GOTO2
000
1980 CLS:INPUTTAB(15,8)"Mo
de Used?"moX
1990 CLS:IFmoX<0ORmoX>5ORm
oX=3GOTO1980
2000 PRINT':OSCLI "SPOOL "
+S$
2010 IFnewX=1NX=NX-320:GOT
O2340
2020 PRINTNX"MO."moX":VDU2
3,1;0;0;0;0;"
2030 PRINTNX+10"PROCinit"
2040 PRINTNX+20"PROC"S$
2050 PRINTNX+30"END"
2060 PRINTNX+40"DEFPROCini
t:DIMx(60):DIMy(60)"
2070 PRINTNX+50"BX=0:F.AX=
0TO360S.6"
2080 PRINTNX+60"x(BX)=SIN(
RAD(AX))"
2090 PRINTNX+70"y(BX)=COS(
RAD(AX))"
2100 PRINTNX+80"BX=BX+1:N.
:E."
2110 PRINTNX+90"DEFPROCscr
een(qX):F.AX=0TOqX"
2120 PRINTNX+100"READPX,XX
,YX,CX,sX,xX,yX,fX"
2130 PRINTNX+110"GC.0,CX:I
FfX)0G."NX+130
2140 PRINTNX+120"PL.PX,XX,
YX:G."NX+300
2150 PRINTNX+130"IFfX)3oX=
1EL.oX=0"
2160 PRINTNX+140"IFfX)3fX=
fX-10"
2170 PRINTNX+150"IFfX=3enX
=59EL.enX=60"
2180 PRINTNX+160"MOVEXX,YX
+yX:F.BX=0TOenXS.sX"
2190 PRINTNX+170"CxX=XX+xX
*x(BX):CyX=YX+yX*y(BX)"
2200 PRINTNX+180"IFoX=1A.f
X=2A.BX=0MOVECxX,CyX"
2210 PRINTNX+190"IFoX=16."
NX+210
2220 PRINTNX+200"IFfX=2ORf
X=3MOVEXX,YX"
2230 PRINTNX+210"IFfX=2PL.
85,CxX,CyX"
2240 PRINTNX+220"IFoX=1A.f
X<>2MOVECxX,CyX"
2250 PRINTNX+230"IFfX=1ORf
X=3DR.CxX,CyX"
2260 PRINTNX+240"IFoX=06."
NX+290
2270 PRINTNX+250"CxX=X1X+x
1X*x(BX)"
2280 PRINTNX+260"CyX=Y1X+y
1X*y(BX)"
2290 PRINTNX+270"IFfX<>2DR
.CxX,CyX"
2300 PRINTNX+280"IFfX=2PL.
85,CxX,CyX"
2310 PRINTNX+290"N.:MOVEXX
,YX"
2320 PRINTNX+300"X1X=XX:Y1
X=YX:x1X=xX:y1X=yX"
2330 PRINTNX+310"N.:E."
2340 PRINTNX+320"DEFPROC"S
$
2350 PRINTNX+330"RES."NX+3
40":PROCscreen("qX"):E."
2360 FORA=0TOqXSTEP2
2370 PRINTA+(10/2)+NX+340"
D."pX(A)","xX(A)","yX(A)","
cX(A)","sX(A)","cxX(A)","cy
X(A)","fX(A)","pX(A+1)","xX
(A+1)","yX(A+1)","cX(A+1)",
"sX(A+1)","cxX(A+1)","cyX(A
+1)","fX(A+1)
2380 NEXT:*SPOOL
2390 NX=A+(10/2)+NX+340:VD
U7:newX=1:CLS
2400 PRINTTAB(4,6)"This dr
awing has now been saved."T
AB(5,8)"Do you want it on t
he screen"TAB(5,10)"while w
orking on the next one?"TAB
(16,12)"Yes/No?":PROCask
2410 ENDPROC
2420 DEFPROCempty:XX=640:Y
X=512
2430 IFflagX=1PROCdraw(qX)
2440 FORA=0TOqX:cX(A)=0:pX
(A)=0
2450 xX(A)=0:yX(A)=0:sX(A)
=0
2460 cxX(A)=0:cyX(A)=0:fX(
A)=0:NEXT
2470 qX=-1:PROCstore(4)
2480 IFflagX=0PROCdraw(qX)
2490 fXX=0:OX=0:ENDPROC
2500 DEFPROCw(pX):TIME=0:R
EPEAT
2510 UNTIL TIME>=pX:ENDPRO
C
2520 DEFPROCan(I,J):IX=SX*
I:JX=SX*J
2530 aX=75*I:i=I:j=J:PROCw
ndl:ENDPROC
2540 DEFPROCerr:*FX21
2550 REPORT:PRINT" at line
";ERL:VDU14
2560 *FX4,0
2570 *FX200,0
2580 ENDPROC
2590 DEFPROCswap:IFtX=0tX=
1ELSEtX=0
2600 PROCdraw(qX):PROCwnd1
2610 PROCw(20):ENDPROC
2620 DEFPROCcopy:AX=qX+1:R
EPEAT:AX=AX-1
2630 UNTILfX(AX)>0ORAX=0
2640 IFAX=0fX=0:ENDPROC
2650 XizeX=cxX(AX):YizeX=c
yX(AX)
2660 fX=1:ENDPROC
2670 DEFPROCinit:DIMx(60):
DIMy(60)
2680 DIMcX(KX+1):DIMfX(KX+
1)
2690 DIMpX(KX+1):DIMsX(KX+
1):*FX4,2
2700 DIMxX(KX+1):DIMyX(KX+
1):fX=0
2710 DIMcxX(KX+1):DIMcyX(K
X+1)
2720 aX=0:BX=0:CX=3:EX=0:n
ewX=0:qX=0
2730 OX=0:SX=20:tX=0:XX=64
0:YX=512:0X=0
2740 FORA=0TO360STEP6:x(BX
)=SIN(RAD(A))
2750 y(BX)=COS(RAD(A)):BX=
BX+1:NEXT
2760 VDU23,226,32,80,80,32
,0,0,0,0
2770 VDU23,227,8,8,8,62,8,
8,8,0
2780 pX(qX)=4:xX(qX)=XX:yX
(qX)=YX
2790 cX(qX)=CX:xX=XX:yX=YX
:ENDPROC
2800 :
2810 IF ERR=17GOTO100
2820 IF ERR=26GOTO250
2830 IF ERR=197OR ERR=199P
RINTTAB(0,2)"Disc fault":GO
TO2860
2840 IF ERR>188:PRINT:REPO
RT:GOTO2860
2850 MODE6:PROCerr:END
2860 PRINTTAB(26,22)"Press
any key"
2870 REPEAT UNTIL GET:GOTO
250
```

This listing is included in this month's cassette tape offer. See order form on Page 53.

Never before have there been such money-saving offers for readers of a computer magazine!

EXPAND your Electron

. . . for much, much less than the price you'd normally pa

NEW STOCKS NOW IN!

How the Plus 1 helps you m the most of your Electron

With the Plus 1, you and your Electron enter a whole new computing dimension. The Plus 1 turns your Electron into a fully fledged micro capable of using printers, joysticks and cartridge ROMs – the software that comes on a chip. In addition, the Plus 1's analogue to digital port gives access to the outside world – while the slots for the ROM cartridges allow the Electron to take advantage of the latest, most exciting hardware developments yet to be released.

If you want to use your Electron to the full, then it's essential you get a Plus 1.

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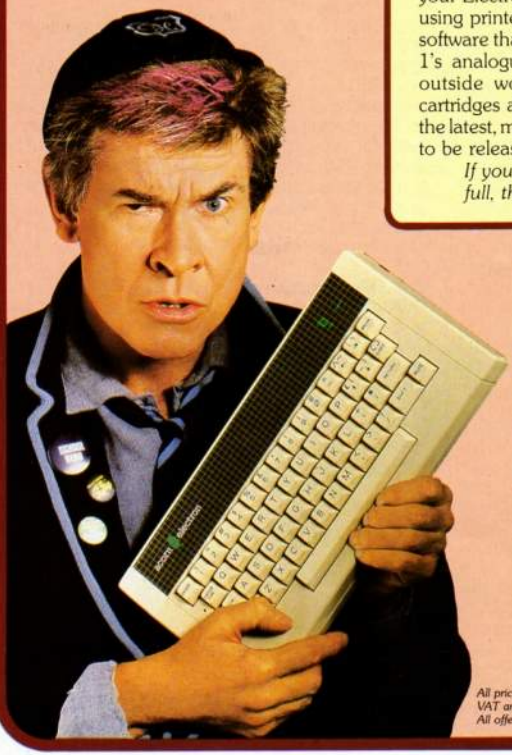
£3

Inc. FI ROM



EXPAND – *with the Electron Word*

Convert your Electron into a sophisticated word proces packed combination. The package consists of the Viewsh together with View, Acorn's custom designed word process cartridge and the many powerful capabilities of View become Whether you're writing a simple letter or your first novel – y the Plus 1 make an unbeatable combination.

Normal price £82.80 **Electron User**

EXPAND – *with the Electron Wo*

Now you can transform your Electron into a serious micr Workstation. This package consists of a Plus 1, View wordprocessor and Viewsheet spreadsheet on ROM car Workstation makes the Electron a hard working yet inexper and office. From business letters to a set of invoices, from h cash flow crises, it can take them all in its stride.

Normal price £119.80 **Electron User**

All prices include VAT and carriage. All offers subject to availability.

Please use the order form o

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REE game
cartridge

d Processor!

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le Plus 1 interface,
sor. Just plug in the
e instantly available.
you'll find View and

r price £49.95

rkstation!

with the Electron
e acclaimed View
tridge ROMs. The
nsive tool for home
ome economics to

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n Page 53

EXPAND – with the under-£100 Plus 3!

The Plus 3 expansion unit provides you with a disc drive and disc interface in one compact unit. It consists of a single sided 80 track drive and ADFS, and can store up to 320k of data on each 3½in disc with no limit to the number of files. Expansion ports at the rear of the unit enable a Plus 1 to be added and a second drive can be attached which can be either 5¼in or 3½in, 40 or 80 track.

The Plus 3 comes complete with a Welcome disc packed full of games, demonstrations, utilities and help files, plus a 111 page manual containing everything you need to get you started right away.

Normal price £219.00 ***Electron User price £99.95***

SAVE £34.05!

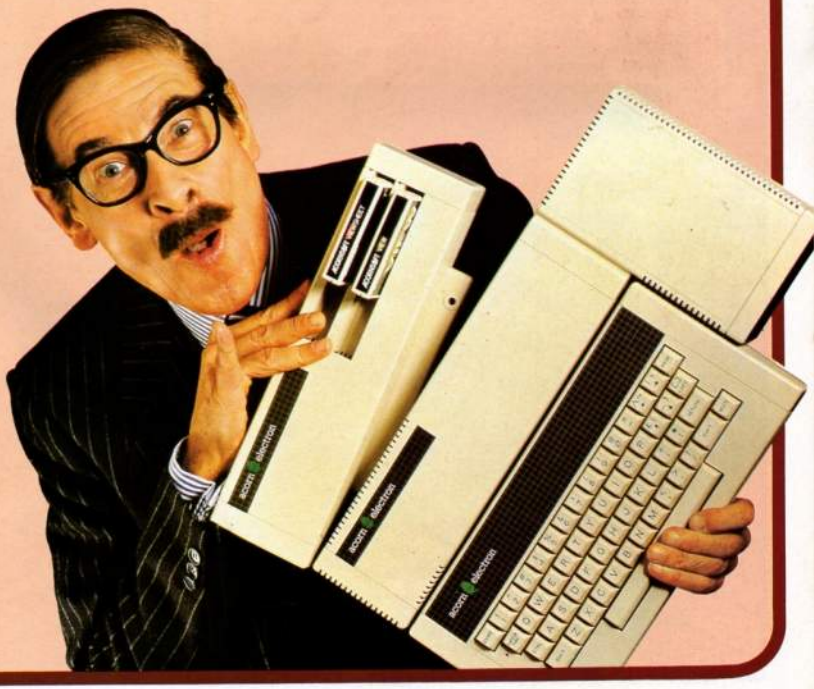
. . . or a Plus 3 PLUS Database!

Bring the speed of discs and the organised memory of a powerful database to your Electron with the Electron Database combined with the Plus 3 disc drive, this dynamic duo should provide the answer to all your dataprocessing needs.

The database has all the facilities any normal user at home or business, would need. Yet – thanks to its menu-driven structure – it's simplicity itself to use. Records can be as varied as you require: You can have up to 32 fields ranging from 2 to over 200 characters in size. Once you've entered the records, information can be recovered with the minimum of fuss, sorting and searching over any number of fields. And when you've created your record structure you're not stuck with it: Field sizes can be changed at will. So, if your interested in keeping records, do yourself a favour: Upgrade to the Electron Database and let your micro do the work.

Normal price £248.95 ***Electron User price £114.95***

SAVE £134!



CAVERN CAPERS

By STEPHEN MERRIGAN

YOUR mission to destroy the enemy base deep within the planet Zargo has been successfully completed and you're on your way home.

Having stolen a small enemy fighter from the base you must fly it through a maze of tunnels back to the surface of Zargo.

These are fraught with danger so you'll need to keep your wits about you if you are to survive. Keep clear of the walls and watch out for the fireballs which bounce to and fro.

Unfortunately the fighter is only a short-range craft which guzzles fuel like a Zargoid Wombat after a week in the desert.

Luckily though, there are oil drums scattered throughout the tunnels which can be used to top up your tanks.

If you vaporise them with your mining lasers they'll be sucked into the air intakes on the ship's hull and fed straight into the engines, providing you with an extra few minutes fuel.

The controls are:

:	Up
/	Down
Shift	Thrust
Ctrl	Fire

Cavern Capers is a long machine code program so take care when entering it and don't forget to save it before running the game.

It you find the prospect of typing in such a complex listing too daunting remember that it is also available on the monthly tape.

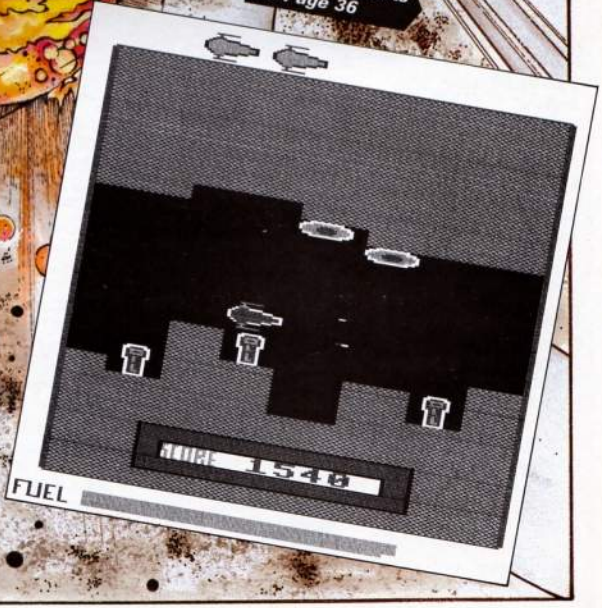
VARIABLES

LEV%	Difficulty level.
LI%	Lives.
dead	Flag to show whether you're dead.
SC%	Score.
HI%()	High scores.

PROCEDURES

hi_sc	Prints the high score table.
ins	Prints the instructions.
assemble	Assembles the machine code.
read	Reads character data.

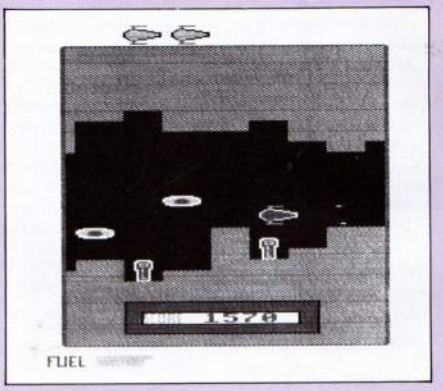
Full listing starts on Page 36



From Page 35

```
  10REM Cavern Capers
  20REM By S.Merrigan
  30REM (c) Electron User
  40IF PAGE>&E00 GOTO5530
  50DIMHIX(7):DIMHI$(7):FO
RI=0TO5:HIX(I)=18:HI$(I)="S
HAUN":NEXT:GOTO100
  60IF?Outflag=0 ANDRND(3)
<>1CALLsoapy:RETURN ELSERET
URN
  70IF?Outflag1=0 ANDRND(3
)<>1CALLsoapy1:RETURN ELSER
ETURN
  80IF?Outflag2=0CALLsoapy
2:RETURN ELSERETURN
  90IX=LEVX:IFRND(3)<>1CAL
Lfuel:RETURN ELSERETURN
  100 ONERROR:MODE6:REPORT:
PRINT" at line ";ERL'':END
  110MODE4:PROCins:*FX16
  120PROCread
  130REPEAT:MODE5:VX=1:SCX=
0:LIX=4:LEVX=7@:REPEAT
  140CLS
  150VDU23,1,0;0;0;0;
  160VDU19,3,4,0;0;0;
  170?brian=255:PROCdraw:?p
ower=&F8:power?1=&7E
  180?dead=0:?&76=0:?&77=5:
?yaiss=25
  190?xpos=0:?ypos=11:?miss
flag=0
  200?addman=&40:addman?1=&
67
  210?Outflag=0:?Outflag1=0
:?Outflag2=0
  220CALLerase
  230IX=0:IX=LEVX
  240REPEAT:IX=IX+1:IFIX=4I
X=0:IX=IX+10:GOSUBIX:?&76=R
ND(6)-1:?&77=RND(6)-1:SCX=S
CX+10:PRINTTAB(9,27);SCX;:C
ALLTony:IFSCX=1500 ORSCX=30
00 LEVX=LEVX-10:VX=VX+1:VDU
19,3,VAL(MID$("456",VX,1));
0;0;
  250CALLgame:UNTIL?dead=1
  260LIX=LIX-1:PROCdead
  270UNTIL LIX=0:PROCcl:*FX
15,1
  280CLS:IF SCX>HIX(5) PROC
hi
  290PROChi_sc
  300UNTIL FALSE
  310DEF PROCdraw
  320VDU23,255,85,170,85,17
0,85,170,85,170
  330VDU23,254,219,146,146,
210,82,82,82,219,23,253,187
,170,170,186,179,170,170,17
1,23,252,249,137,137,201,13
7,137,137,143,23,251,116,68
,68,68,100,68,68,119
  340COLOUR130:COLOUR1
  350FORIX=2TO7:PRINTTAB(2,
IX);STRING$(17,CHR$255);:NE
XT
  360FORIX=24TO29:PRINTTAB(
2,IX);STRING$(17,CHR$255);:
NEXT
  370VDU28,2,23,18,8:COLOUR
131:CLS
  380GCOL0,2:MOVE120,60:DRA
W1184,60:DRAW1184,960:DRAW1
20,960:DRAW120,60:GCOL0,3
  390GCOL0,0:FORIX=1192TO12
00STEP8:MOVEIX,60:DRAWIX,96
0:NEXT
  400COLOUR130:COLOUR2:VDU2
6
  410FORI=0TO2:PRINTTAB(5,2
6+I);"          ";:NEXT
  420GCOL0,3:MOVE320,192:DR
AW320,96:DRAW960,96:DRAW960
,192:DRAW320,192:GCOL0,2:MO
VE1192,64:DRAW1192,956:MOVE
112,64:DRAW112,956
  430COLOUR128:COLOUR1:VDU2
6:GCOL0,3
  440MOVE376,160:DRAW376,12
4:DRAW982,124:DRAW982,160:D
RAW376,160
  450VDU31,6,27,254,253,32,
32,32,32,32,32,17,2,31,1,31
,252,251
  460FORIX=0TOLIX*30STEP40:
!addaan=&5850+IX:CALLerase:
NEXT
  470FORIX=0TO255:IX?&7EF8=
&0F:NEXT
  480ENVELOPE1,2,-18,-50,18
,10,2,2,0,0,0,0,0,0
  490VDU19,3,VAL(MID$("456"
,VX,1));0;0;
  500ENDPROC
  510DEFPROCassemble
  520addaan=&78:seaiaan=&80
  530xpos=&85:missile=&9A:a
issflag=&9C
  540ypos=&86:brian=&95
  550er=&87:power=&96
  560var=&89:missile1=&93
  570dead=&8A:yaiss=&9D:xst
eve=&99
  580topbou=&8B:Topbou=&900
:Topbou1=&907:Topbou2=&90E
  590boflag=&8C:Boflag=&901
:Boflag1=&908:Boflag2=&90F
  600bounce=&8D:Bounce=&902
:Bounce1=&909:Bounce2=&910
  610xb=&BF:Xb=&904:Xb1=&90
B:Xb2=&912
  620yb=&90:Yb=&905:Yb1=&90
C:Yb2=&913
  630outflag=&91:Outflag=&9
06:Outflag1=&90D:Outflag2=&
914
  640DIMQX 2000
  650FORI=0TO2STEP2
  660P%=Q%
  670[OPTI
  680.game
  690JSRkeys
  700JSRfire
  710LDAaissflag:CMP#1:BNEg
ame4:JSRbomb
  720.game4
  730JSRscroll
  740JSRpi
  750LDAOutflag:CMP#1:BNEga
me1:JSRBouncer
  760.game1
  770LDAOutflag1:CMP#1:BNEg
ame2:JSRBouncer1
  780.game2
  790LDAOutflag2:CMP#1:BNEg
ame3:JSRBouncer2
  800.game3
  810JMPcheck
  820.scroll
  830LDA&4&20:STA&70:LDX#15
  840LDA&4&28:STA&72:LDY#0
  850LDA&4&62:STA&71:STA&73
  860.woops
  870CPXypos:BNEwoops1:STYe
r+1:JSRerase:LDYer+1
  880.woops1
  890DECypos:CPXypos:BNEwoo
ps2:STYer+1:JSRerase:LDYer+
1
  900.woops2
  910INCypos
  920.whip CPXyaiss:BNEwhip
1:STYer+1:JSRpraissile:LDYe
r+1
  930.whip1 DECyaiss:CPXyai
ss:BNEwhip2:STYer+1:JSRprai
ssile:LDYer+1
  940.whip2 INCyaiss
  950.loop1
  960LDA(&72),Y
  970STA(&70),Y
  980INY
  990BNEloop1
 1000LDA&70:CLC
 1010ADC#&40:STA&70
 1020LDA&71:ADC#1
 1030STA&71
 1040LDA&72:CLC
 1050ADC#&40:STA&72
 1060LDA&73:ADC#1
 1070STA&73
 1080CPXypos:BNEwoopy1:JSRe
rase:LDYer+1
 1090.woopy1
 1100DECypos:CPXypos:BNEwoo
py2:STYer+1:JSRerase:LDYer+
1
 1110.woopy2
 1120INCypos
 1130CPXyaiss:BNEwhipy1:JSR
praissile:LDYer+1
 1140.whipy1 DECyaiss:CPXya
iss:BNEwhipy2:STYer+1:JSRpr
aissile:LDYer+1
 1150.whipy2 INCyaiss
 1160DEX
 1170BPLstevie
 1180RTS
 1190.stevie JMPwoops
 1200.pi
 1210LDX#5:LDA#&E0:STA&74
 1220LDA#&70:STA&75
 1230.loop2
 1240TXA:SBC&76
 1250BMIcols
 1260BPLwhites
 1270.pi1 LDA&74:CLC:ADC#&4
0
 1280STA&74:LDA&75:ADC#1
 1290STA&75
 1300DEX
 1310BPLloop2
 1320LDX#5:LDA#&20:STA&74
 1330LDA#&63:STA&75
 1340.loop5
 1350TXA:SBC&77
 1360BMIwhite1
 1370BPLcol1
 1380.pi2 LDA&74:CLC:ADC#&4
0
 1390STA&74:LDA&75:ADC#1
```

```
1400STA&75
1410DEX
1420BPLloop5
1430RTS
1440.white1 JSRwhite:JMPpi
2
1450.whites JSRwhite:JMPpi
1
1460.cols JSRcol:JMPpi1
1470.col1 JSRcol:JMPpi2
1480.white LDY#7
1490.loop3
1500LDA#255
1510STA(&74),Y
1520 DEY
1530STA(&74),Y
1540DEY
1550BPLloop3
1560RTS
1570.col LDY#7
1580.loop4
1590LDA#90
1600STA(&74),Y
1610DEY
1620LDA#165
1630STA(&74),Y
1640DEY
1650BPLloop4
1660RTS
1670.up
1680INCypos
1690JSRerase
1700LDAaddman:SEC:SBC#&40:
STAaddman
1710LDAaddman+1:SBC#1:STAa
ddman+1
1720JMPerase
1730.down
1740DECypos
1750JSRerase
1760LDAaddman:CLC:ADC#&40:
STAaddman
1770LDAaddman+1:ADC#1:STAa
ddman+1
1780JMPerase
1790.erase
1800LDY#31:LDAaddman:STAse
miman
1810LDAaddman+1:STAsemiman
+1
1820.erase1
1830LDA&C80,Y
1840EOR(semiman),Y
1850STA(semiman),Y
1860DEY
1870BPLerase1
1880LDY#31:LDAsemiman:CLC:
ADC#&40:STAsemiman
1890LDAsemiman+1:ADC#1:STA
semiman+1
1900.erase2
1910 LDA&C20,Y
1920 EOR(semiman),Y
1930 STA(semiman),Y
1940 DEY
1950 BPLerase2
1960 RTS
1970 .fire
1980 LDA#129:LDX#&FE:LDY#&
FF:JSR&FFF4
1990 TYA:BEQkey:LDAmissfla
g:CMP#1:BEQkey
2000 LDA87:LDX#sound1 MOD2
56:LDY#sound1 DIV256:JSR&FF
F1
2010 LDAypos:STAymiss:LDAx
pos:STAxsteve
2020 INCmissflag:LDAaddman
:STAmissile:LDAaddman+1:STA
missile+1
2030 LDAmissile:CLC:ADC#&4
0:STAmissile1
2040 LDAmissile+1:ADC#1:ST
Amissile1+1
2050 JSRTony:JSRprmissile:
JSRbomb:JMPbomb
2060 .key RTS
2070 .keys
2080 LDA#129:LDX#&B7:LDY#&
FF:JSR&FFF4
2090 TYA:BEQkey1:JSRup:JMP
key2
2100 .key1
2110 LDA#129:LDX#&97:LDY#&
FF:JSR&FFF4
2120 TYA:BEQkey2:JSRdown
2130 .key2
2140 LDA#129:LDX#&FF:LDY#&
FF:JSR&FFF4
2150 TYA:BEQkey3:JMPthrust
2160 .key3 LDAxpos:CMP#0:B
EQkey4:BPLkey5
2170 .key4 RTS
2180 .key5 DECxpos:JSReras
e:LDAaddman:SEC:SBC#8:STAad
dman
2190 LDAaddman+1:SBC#0:STA
addman+1
2200 JMPerase
2210 .thrust LDA87:LDX#sou
nd2 MOD256:LDY#sound2 DIV25
6:JSR&FFF1:JSRTony
2220 LDAxpos:CMP#17:BMIthr
ust1:RTS
2230 .thrust1 INCxpos
2240 JSRerase
2250 LDAaddman:CLC:ADC#8:S
TAaddman
2260 LDAaddman+1:ADC#0:STA
addman+1
2270 JMPerase
2280 .check
2290 LDY#7
2300 LDA(addman),Y:CMP#112
:BEQcheck1:LDA#1:STAdead
2310 .check1
2320 LDY#31
2330 LDA(addman),Y:CMP#224
:BEQcheck2:LDA#1:STAdead
2340 .check2
2350 LDY#7
2360 LDA(semiman),Y:CMP#25
5:BEQcheck3:LDA#1:STAdead
2370 .check3
2380 LDY#31
2390 LDA(semiman),Y:CMP#25
5:BEQcheck4:LDA#1:STAdead
2400 .check4
2410 RTS
2420 .fuel
2430 LDY&76:LDA#&D0:STA&70
2440 LDA#&75:STA&71
2450 .set
2460 DEY:BMIset1
2470 LDA&70:SEC:SBC#&40:ST
A&70
2480 LDA&71:SBC#1:STA&71
2490 JMPset
2500 .set1
2510 LDY#15
2520 .set2
2530 LDA&C70,Y
2540 EOR(&70),Y
2550 STA(&70),Y
2560 DEY
2570 BPLset2
2580 LDA&70:SEC:SBC#&40:ST
A&70
2590 LDA&71:SBC#1:STA&71
2600 LDY#15
2610 .set3
2620 LDA&C60,Y
2630 EOR(&70),Y
2640 STA(&70),Y
2650 DEY:BPLset3
2660 RTS
2670 .bouncer
2680 DECyb:BPLbouncer1
2690 LDA#0:STAoutflag:RTS
2700 .bouncer1
2710 LDAbounce:SEC:SBC#8:S
TAbounce
2720 LDAbounce+1:SBC#0:STA
bounce+1
2730 LDAboflag
2740 BEQboup
2750 .bodo1
2760 LDXxb:BNEbodo:STXbofl
ag:JMPboup
2770 .bodo
2780 JSRbprint
2790 LDAbounce:CLC:ADC#&40
```



From Page 37

```
:STAbounce
 2880 LDAbounce+1:ADC#1:STA
bounce+1
 2810 DECxb
 2820 JMPbprint
 2830 .boup
 2840 LDXxb:CPXtopbou:BNEbo
up1:LDA#1:STAboflag:JMPbodo
 2850 .boup1
 2860 JSRbprint
 2870 LDAbounce:SEC:SBC#&40
:STAbounce
 2880 LDAbounce+1:SBC#1:STA
bounce+1
 2890 INCxb
 2900 JMPbprint
 2910 .bprint
 2920 LDY#31
 2930 .bprint1
 2940 LDA&C40,Y
 2950 EOR(bounce),Y
 2960 STA(bounce),Y
 2970 DEY
 2980 BPLbprint1
 2990 RTS
 3000 .soap
 3010 LDY&76:LDA#&C0:STAbou
nce
 3020 LDA#&75:STAbounce+1
 3030 .soap1
 3040 DEY:BMIsoap2
 3050 LDAbounce:SEC:SBC#&40
:STAbounce
 3060 LDAbounce+1:SBC#1:STA
bounce+1
 3070 JMPsoap1
 3080 .soap2
 3090 LDA#10:SEC:SBC&76
 3100 CLC:ADC&77
 3110 STAtopbou:JSRkeys:LDA
missflag:CMP#1:BNEsap:JSRbo
mb
 3120 .sap JSRscroll:JSRche
ck:JMPbprint
 3130 .soapy
 3140 JSRsoap
 3150 LDAbounce:STABounce
 3160 LDAbounce+1:STABounce
+1
 3170 LDA#1:STAOutflag
 3180 LDA#0:STAXb:STABoflag
 3190 LDA#26:STAYb
 3200 LDAtopbou:STATopbou
 3210 LDABounce1:SEC:SBC#8:
STABounce1
 3220 LDABounce1+1:SBC#0:ST
ABounce1+1
 3230 LDABounce2:SEC:SBC#8:
STABounce2
 3240 LDABounce2+1:SBC#0:ST
ABounce2+1
 3250 RTS
 3260 .soapy1
 3270 JSRsoap
 3280 LDAbounce:STABounce1
 3290 LDAbounce+1:STABounce
1+1
 3300 LDA#1:STAOutflag1
 3310 LDA#0:STAXb1:STABofla
g1
 3320 LDA#26:STAYb1
 3330 LDAtopbou:STATopbou1
 3340 LDABounce:SEC:SBC#8:S
TABounce
 3350 LDABounce+1:SBC#0:STA
Bounce+1
 3360 LDABounce2:SEC:SBC#8:
STABounce2
 3370 LDABounce2+1:SBC#0:ST
ABounce2+1
 3380 RTS
 3390 .soapy2
 3400 JSRsoap
 3410 LDAbounce:STABounce2
 3420 LDAbounce+1:STABounce
2+1
 3430 LDA#1:STAOutflag2
 3440 LDA#0:STAXb2:STABofla
g2
 3450 LDA#26:STAYb2
 3460 LDAtopbou:STATopbou2
 3470 LDABounce:SEC:SBC#8:S
TABounce
 3480 LDABounce+1:SBC#0:STA
Bounce+1
 3490 LDABounce1:SEC:SBC#8:
STABounce1
 3500 LDABounce1+1:SBC#0:ST
ABounce1+1
 3510 RTS
 3520 .Bouncer
 3530 LDABounce:STAbounce
 3540 LDABounce+1:STAbounce
+1
 3550 LDAOutflag:STAoutflag
 3560 LDATopbou:STAtopbou
 3570 LDAXb:STAxb:LDAYb:STA
yb
 3580 LDABoflag:STAboflag
 3590 JSRbouncer
 3600 LDAbounce:STABounce
 3610 LDAbounce+1:STABounce
+1
 3620 LDAoutflag:STAOutflag
 3630 LDAtopbou:STATopbou
 3640 LDAxb:STAXb:LDAyb:STA
Yb
 3650 LDAboflag:STABoflag
 3660 RTS
 3670 .Bouncer1
 3680 LDABounce1:STAbounce
 3690 LDABounce1+1:STAbounc
e+1
 3700 LDAOutflag1:STAoutfla
g
 3710 LDATopbou1:STAtopbou
 3720 LDAXb1:STAxb:LDAYb1:S
TAyb
 3730 LDABoflag1:STAboflag
 3740 JSRbouncer
 3750 LDAbounce:STABounce1
 3760 LDAbounce+1:STABounce
1+1
 3770 LDAoutflag:STAOutflag
1
 3780 LDAtopbou:STATopbou1
 3790 LDAxb:STAXb1:LDAyb:ST
AYb1
 3800 LDAboflag:STABoflag1
 3810 RTS
 3820 .Bouncer2
 3830 LDABounce2:STAbounce
 3840 LDABounce2+1:STAbounc
e+1
 3850 LDAOutflag2:STAoutfla
g
 3860 LDATopbou2:STAtopbou
 3870 LDAXb2:STAxb:LDAYb2:S
TAyb
 3880 LDABoflag2:STAboflag
 3890 JSRbouncer
 3900 LDAbounce:STABounce2
 3910 LDAbounce+1:STABounce
2+1
 3920 LDAoutflag:STAOutflag
2
 3930 LDAtopbou:STATopbou2
 3940 LDAxb:STAXb2:LDAyb:ST
AYb2
 3950 LDAboflag:STABoflag2
 3960 RTS
 3970 .endbomb
 3980 CMP#79:BNEtin:LDAmiss
ile:CLC:ADC#&58:STA&70:LDAm
issile+1:ADC#1:STA&71:JMPen
dbomb1
 3990 .tin
 4000 CMP#223:BNEtin1:LDAmi
ssile:CLC:ADC#&58:STA&70:LD
Amissile+1:ADC#1:STA&71:JMP
endbomb1
 4010 .tin1
 4020 CMP#71:BNEtin2:LDAmis
sile:CLC:ADC#24:STA&70:LDAm
issile+1:ADC#0:STA&71:JMPen
dbomb1
 4030 .tin2
 4040 CMP#222:BNEtin3:LDAmi
ssile:CLC:ADC#16:STA&70:LDA
missile+1:ADC#0:STA&71:JMPe
ndbomb1
 4050 .tin3
 4060 LDA#7:LDX#sound4 MOD2
56:LDY#sound4 DIV256:JSR&FF
F1
 4070 DECmissflag:LDA#255:S
TAymiss:JMPpraissile
 4080 .endbomb1 JSRpraissil
e:LDY#15:LDA#255
 4090 .endbomb2
 4100 STA(&70),Y
 4110 DEY
 4120 BPLendbomb2
 4130 LDA&70:CLC:ADC#&40:ST
A&70
 4140 LDA&71:ADC#1:STA&71
 4150 LDY#15:LDA#255
 4160 .endbomb3
 4170 STA(&70),Y
 4180 DEY:BPLendbomb3
 4190 DECmissflag:LDA#255:S
TAymiss:LDA#7:LDX#sound3 MO
D256:LDY#sound3 DIV256:JSR&
FFF1
 4200 JMPearty
 4210 .praissile
 4220 LDY#24
 4230 LDA#207
 4240 EOR(missile),Y
 4250 STA(missile),Y
 4260 LDA#63:LDY#29
 4270 EOR(missile1),Y
 4280 STA(missile1),Y
 4290 RTS
 4300 .bomb
 4310 LDAxsteve:CMP#24:BNEs
tep:JMPtin3
 4320 .step LDY#24:LDA(miss
```

```
ile),Y
 4330 CMP#48:BEQstephen1:JM
Pendbomb
 4340 .stephen1 LDY#29:LDA(
missile1),Y
 4350 CMP#192:BEQstephen:JM
Pendbomb
 4360 .stephen JSRpmissile
 4370 LDAmissile:CLC:ADC#8:
STAmissile
 4380 LDAmissile+1:ADC#0:ST
Amissile+1
 4390 LDAmissile1:CLC:ADC#8
:STAmissile1
 4400 LDAmissile1+1:ADC#0:S
TAmissile1+1
 4410 INCxsteve:JMPpmissil
e
 4420 .Tony
 4430 LDYbrian
 4440 LDA#0:STA(power),Y
 4450 DECbrian
 4460 BNETony1:LDA#1:STAdea
d
 4470 .Tony1 RTS
 4480 .aarty
 4490 LDAbrian:CLC:ADC#8
 4500 BCSaarty1:STAbrian
 4510 LDYbrian:LDX#7:LDA#&0
F
 4520 .aarty2
 4530 STA(power),Y:DEY:DEX
 4540 BPLaarty2
 4550 .aarty1 RTS
 4560 .sound1 EQUW&11:EQUW1
:EQUW150:EQUW2
 4570 .sound2 EQUW8:EQUW1:E
QUW5:EQUW2
 4580 .sound3 EQUW&12:EQUW1
:EQUW50:EQUW8
 4590 .sound4 EQUW&11:EQUB-
1:EQUB&FF:EQUW150:EQUW2
 4600 .death
 4610 LDY#31
 4620 .death1 LDA&70
 4630 STA(addman),Y:STA(sea
iman),Y
 4640 DEY:BPLdeath1:RTS
 4650 ]
 4660 NEXT
 4670 ENDPROC
 4680 DEFPROCread
 4690 FORIX=0TO127:READAX:I
X?&C00=AX:NEXT
 4700 ENDPROC
 4710REM star
 4720REM rows=14
 4730DATA16,0,16,35,71,143,
143,143
 4740DATA240,128,192,63,15,
15,15,15
 4750DATA192,0,0,204,63,15,
15,15
 4760DATA0,0,0,0,136,127,31
,31
 4770DATA143,71,35,16,0,16,
0,0
 4780DATA15,15,63,192,128,2
40,0,0
 4790DATA15,63,204,0,0,192,
0,0
 4800DATA127,136,0,0,0,0,0,
0
 4810REM bouncer
 4820REM rows=8
 4830DATA 17,119,252,248,24
8,116,119
 4840DATA17,255,240,195,135
,135,195,240
 4850DATA255,255,240,60,30,
30,60,240
 4860DATA255,136,238,243,24
1,241,243
 4870DATA238,136
 4880REM oil
 4890REM rows=16
 4900DATA119,207,188,173,18
8,143,158,222
 4910DATA238,63,211,91,211,
31,63,46
 4920DATA86,71,86,86,86,86,
71,119
 4930DATA46,46,46,46,46,166
,46,238
 4940 DEF PROChi:VDU20:GX=3
 4950 PROCa(5,10,"Enter nam
e")
 4960 PROCa(5,13,"_________
")
 4970 GX=2:S$="":PRINTTAB(5
,12);
 4980 REPEAT:KEY=GET:SOUND1
,-15,100,1
 4990 IF KEY()127 AND POS(=
14 PROCa(POS,VPOS,CHR$KEY):
S$=S$+CHR$KEY
 5000 IF KEY=127 AND POS)=6
VDUKEY:S$=LEFT$(S$,(POS-5)
)
 5010 UNTIL KEY=13
 5020 HI$(7)=S$:HIX(7)=SCX
 5030 ?ymiss=255:?ypos=255:
FORIX=1TO26:CALLscroll:SOUN
D1,-15,120,1:NEXT
 5040 FORI=5TO1STEP-1
 5050 IF HIX(7)>HIX(I) PROC
swap
 5060 NEXT
 5070 CLS
 5080 ENDPROC
 5090 DEF PROCswap
 5100 HIX(I+1)=HIX(I):HI$(I
+1)=HI$(I)
 5110 HIX(I)=HIX(7):HI$(I)=
HI$(7)
 5120 ENDPROC
 5130 DEF PROChi_sc:VDU20,1
7,2:GX=3
 5140 PRINTTAB(4,2);"Hi Sco
res"
 5150 PROCa(4,3,"-- ------"
)
 5160 FORI=4TO20STEP4
 5170 PROCa(0,4+I,STR$(I/4)
)
 5180 PROCa(2,4+I,HI$(I/4))
 5190 PROCa(14,4+I,STR$(HIX
(I/4)))
 5200 NEXT
 5210 COLOUR2
 5220 PRINT'''SPC(4);"Press
 Space";
 5230 REPEAT UNTIL GET$=" "
:ENDPROC
 5240 DEF PROCcl
 5250 GCOL0,0
 5260 FORIX=0TO640STEP16:MO
VEIX,0:DRAWIX,1024:MOVEIX+8
,0:DRAWIX+8,1024:MOVE1279-I
X+8,0:DRAW1279-IX+8,1024:MO
VE1279-IX,0:DRAW1279-IX,102
4:SOUND1,1,IX/4+5,1:NEXT
 5270 ENDPROC
 5280 DEF PROCa(AX,BX,A$)
 5290 COLOUR6X:GCOL0,1
 5300 PRINTTAB(AX,BX);A$;
 5310 VDU5:MOVEAX*64-8,(32-
BX)*32-8
 5320 PRINT;A$;:VDU4
 5330 ENDPROC
 5340DEFPROCdead:FORIX=1TO5
:TIME=0:SOUND1,1,100+IX*10,
2:?&70=RND(255):CALLdeath:R
EPEAT UNTIL TIME)15:NEXT:EN
DPROC
 5350 DEFPROCins
 5360 VDU23,1,0;0;0;0;
 5370 VDU19,1,2;0;0;
 5380 VDU19,0,4;0;0;
 5390 DRAW1279,0:DRAW1279,1
023:DRAW0,1023:DRAW0,0
 5400 VDU28,2,29,38,1
 5410 PRINTTAB(12);"Cavern
 Capers"
 5420 PRINTTAB(12);"------
------"
 5430 PRINT'" You have bee
n given command of a'''"s
paceship. Your mission is t
o escape"
 5440 PRINT'"from heavily
 defended underground"
 5450 PRINT'"caverns. Your
 ship is a short range'''"c
raft so in order to stay a
loft you"
 5460 PRINT'"must explode
fuel tanks with your'''"p
owerful lazers . To add
to your"
 5470 PRINT'"troubles the
 caverns become more'''"d
ifficult to pass through
as you'''"continue."
 5480 PRINT'"Your keys are-
"
 5490 PRINT'TAB(10);": - up
  / - down'''TAB(3);"<SHIF
T> - Thrust <CTRL> - fire"
 5500 PROCassemble:VDU7,26,
17,0,17,129
 5510 PRINTTAB(14,30);"PRES
S SPACE";
 5520 REPEAT UNTIL GET=32:E
NDPROC
 5530*KEY0 *T.!MDX=PAGE-&E0
0:FORIX=PAGE TO TOP STEP4:!
(IX-DX)=!IX:NEXT:!(TOP-DX)=
&FF0D:PAGE=&E00!MOLD!MRUN!M
 5540*FX138,0,128
```

This listing is included in this month's cassette tape offer. See order form on Page 53.

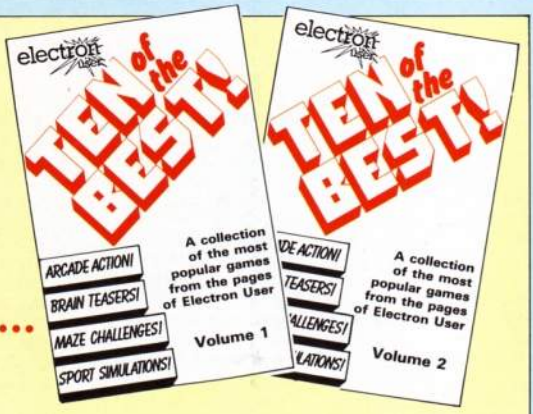
WORN OUT with wordprocessing?

DEPRESSED with databases?

OPPRESSED with machine code?

Then you need...

(It's the perfect antidote to microcomputer malaise!)



These two cassettes are not only crammed with 18 of the best games from the early days of Electron User. At no extra expense, we've included on each an unpublished Roland Waddilove machine code masterpiece as a freebie. Roland's Jam Butty and Atom Smash are arcade action at its fastest and most frustrating. And they're only available with Ten of the Best. So give yourself a treat ... with the most popular cassettes we've ever produced.

ONLY £5.95 each

Volume 1 contains:

Jam Butty
Machine code simulation of high drama on a building site
Golf
Play a round by yourself, or play against your pals.
Haunted House
Fight against all the odds to get out alive.
Space Hike
Another classic. Help the spacemen avoid maurading monsters.
Parky's Peril
Help Parky through an invisible maze, racing against time.
Rally Driver
All the thrills of high-speed driving, with none of the risks.
Alphaswap
Your letters are in a twist. Can you put them in order?
Knockout
Fast and furious action as you batter down a brick wall.
Money Maze
Avoid ghosts and collect coins in an all-action arcade classic.
Lunar Lander
The traditional computer game specially written for the Electron.

Volume 2 contains:

Atom Smash
Machine code thrills as you help to save the world from destruction.
Bunny Blitz
Go egg collecting, but keep away from the proliferating rabbits.
Castles of Sand
Build castles – but beware the rising tide and hungry sandworms.
Reaction Timer
Test your reactions with this traffic lights simulation.
Solitaire
The Electron version of the age-old game of logic and patience.
Jumper
Jump for your life in this exciting arcade action game.
Break free
Test your wits and reflexes in this popular classic ball game.
Code Breaker
Crack the code in a colourful if frustrating brainteaser.
Parachute
Save the plunging sky divers from a watery end.
Star Fighter
Attack the bandit ships in this fast-moving 3D punch-up.

TO ORDER, PLEASE USE THE FORM ON PAGE 53

COMPANY COUNT

a/c payee

£1,000,000

By ANDREW & STEPHEN WEIR

THE object of this educational game is to become president of a company and gain as much money as possible.

You must correctly answer at least four out of five mathematical questions to get promoted. The questions are based on addition, subtraction and simple multiplication.

If you answer two questions incorrectly you will be demoted.

There are seven levels. With each one you have a chance of further promotion, until you finally become President.

Each time you answer a question correctly you win some money, but if you answer incorrectly you lose some.

The game ends when you are bankrupt, get laid off or complete all seven levels.

Once it has ended you'll be asked "Do you want to play again?" Pressing Y will allow another person to play and N aborts the program.

The game is fully compatible with the Electron and BBC 32k OS 1.0 or greater.

Some of the lines are quite long, so you'll need to use abbreviations for Basic commands. For instance, you can use C. rather than COLOUR.

The program is a bit tight on memory, so don't add any unnecessary space – such as the space following the line numbers, which is only shown in the listed version for clarity.

Full listing starts on Page 42

VARIABLES

money%	Amount of money you've got.
question%	Question number.
wrong%	Number of questions wrong.
right%	Number of questions right.
level%	Difficulty level.

PROCEDURES

box	Draws the boxes.
picture	Draws the pictures in the boxes.
wipe	Clears a box.
rndquestion	Asks a random question.
vars	Initialises the variables.
ending	Prints the end message.

From Page 41

```
   10 REM Company Count
   20 REM By S and A Weir
   30 REM (c) Electron User
   40 IF PAGE>&E00 GOTO 103
0
   50 GOSUB 60:GOSUB 490:GO
TO1010
   60 ONERROR IF ERR=17 RUN
 ELSE MODE7:PRINT'''':REPORT
:PRINT" at line ";ERL:END
   70  *FX200,1
   80 *fx226
   90 *fx16,0
  100 *fx227
  110 *fx9,10
  120 *fx10,10
  130 *fx11,0
  140 VDU23,140,85,170,85,1
70,85,170,85,170:oswrch=&FF
EE:osword=&FFF1:ENVELOPE1,1
,0,15,0,30,1,30,126,0,0,-12
6,126,126:*FX4,2
  150 DIMMC%100:FORI%=0TO2S
TEP2:P%=MC%:[OPTI%:.d STAb:
LDA@10:LDX@b AND255:LDY@b D
IV256:JSRosword:LDA@0:STAj:
.d1 LDA@23:JSRoswrch:LDAj:O
RA@224:JSRoswrch:LDAj:ASLA:
ASLA:TAX:LDY@4:.d2 INX:LDAb
,X:JSRoswrch:JSRoswrch:DEY:
BNEd2:INCj:LDAj
  160 CMP@2:BNEd1:LDX@4:.d3
 LDAs,X:JSRoswrch:DEX:BPLd3
:RTS:.br];j=b+9:s=j+1:$s=CH
R$11+CHR$225+CHR$8+CHR$10+C
HR$224:NEXT:MODE2:VDU23;820
2;0;0;0;:VDU 23,240,0,68,40
,16,40,68,0,0:DIMstaff$(7):
PROCsetup:RETURN
  170 DATA-2,3,4,18,5,18,6,
18,7,18,8,18,9,18,10,18,11,
18,12,18,13,18,14,18,15,18
  180 DATA3,17,4,17,5,17,6,
17,7,17,8,17,9,17,10,17,11,
17,12,17,13,17,14,17,15,17,
16,17,3,16,4,16,5,16,6,16,7
,16,8,16,9,16,10,16,11,16,1
2,16,13,16,14,16,15,16,16,1
6,2,15,3,15,4,15,15,15,16,1
5,17
  190 DATA15,4,14,15,14,3,1
3,4,13,15,13,16,13,3,12,16,
12,3,11,4,11,15,11,16,11,4,
10,15,10,4,9,5,9,6,9,13,9,1
4,9,15,9,6,8,7,8,8,8,9,8,10
,8,11,8,12,8,13,8,-2,6,8,15
,7,14,11,15,12,14,-2,4,8,13
,11,13,-2,5,9,12,10,12,-2,1
,6,11,7,11
  200 DATA8,10,9,10,10,10,1
1,10,12,11,13,11,-2,7,7,7,8
,7,9,7,10,7,11,7,12,7,8,6,9
,6,10,6,11,6,9,5,10,5,5,15,
6,15,7,15,9,15,10,15,12,15,
13,15,14,15,5,14,6,14,8,14,
9,14,10,14,11,14,13,14,14,1
4,5,13,6,13,7,13,9,13,10,13
,12,13,13,13,14,13
  210 DATA4,12,5,12,6,12,7,
12,8,12,11,12,12,12,13,12,1
4,12,15,12,5,11,9,11,10,11,
14,11,5,10,6,10,7,10,12,10,
13,10,14,10,6,9,7,9,8,9,9,9,10,
9,11,9,12,9,8,11,11,11,-1
  220 DATA1,1,2,1,3,1,4,1,5
,1,6,1,7,1,8,1,9,1,10,1,11,
1,12,1,13,1,14,1,15,1,16,1,
17,1,18,1,1,2,2,2,3,2,4,2,5
,2,6,2,7,2,8,2,9,2,10,2,11,
2,12,2,13,2,14,2,15,2,16,2,
17,2,18,2,1,3,2,3,3,3,4,3,5
,3,6,3,7,3,8,3,9,3,10,3,11,
3,12,3,13,3,14,3,15,3,16
  230 DATA3,17,3,18,3,2,4,3
,4,4,4,5,4,6,4,7,4,8,4,9,4,
10,4,11,4,12,4,13,4,14,4,15
,4,16,4,17,4,2,5,3,5,4,5,5,
5,6,5,7,5,8,5,11,5,12,5,13,
5,14,5,15,5,16,5,17,5,3,6,4
,6,5,6,6,6,7,6,12,6,13,6,14
,6,15,6,16,6,5,7,6,7,13,7,1
4,7,-1
  240 DATA10,6,9,6,8,5,8,6,
8,7,7,7,7,6,7,5,6,6,11,6,11
,5,11,7,12,6,12,5,12,7,13,6
,-1
  250 DATA"Messenger",Sales
man,Head of Departsent,Sale
s Manager,Secretary,Vice Pr
esident,President
  260 DEFPROCDBL6(A$,xI,yX)
VDU5:MOVExX,yY:FORCHX=1TOLE
NA$:AX=ASCMID$(A$,CHX,1):CA
LLd:NEXT:VDU4:ENDPROC
  270 DEFPROCDBLM(A$,xI,yX)
PRINTTAB(xX,yY);:FORCHX=1TO
LENA$:AX=ASCMID$(A$,CHX,1):
CALLd:NEXT:ENDPROC
  280 DEF PROCbox(dX) GCOL0
,7:xX=dX*185-185:MOVExX,686
:DRAWxX,840:DRAWxX+168,840:
DRAWxX+168,686:DRAWxX,686:E
NDPROC
  290 DEF PROCpicture(dX) P
ROCface:PROCshirt(dX):IF dX
=7 PROCbowtie
  300 VDU29,0;0;:ENDPROC
  310 DEF PROCface RESTORE
170:VDU29,dX*185-185+8;687;
:REPEAT:READxX:IFxX=-1 THEN
 UNTILxX=-1:ENDPROC ELSE IF
 xX=-2 THEN READ xX:GCOL0,x
X:READxX
  320 PROCread:UNTIL0
  330 DEF PROCread:READ yX:
PLOT69,xX*8,yX*8:PLOT69,xX*
8,(yX*8)+4:ENDPROC
  340 DEF PROCshirt(dX) GCO
L 0,dX:RESTORE220:REPEAT:RE
ADxX:IF xX=-1 UNTIL-1:ENDPR
OC ELSE PROCread
  350 UNTIL0
  360 DEFPROCbowtie GCOL0,8
:RESTORE240:REPEAT:READxX:I
F xX=-1 UNTIL-1:ENDPROC ELS
E PROCread
  370 UNTIL0
  380 DEF PROCwipe(dX) VDU2
4,dX*185-185+8;687+4;dX*185
-185+8+(18*8);687+(18*8)+4;
:CLG:VDU26:ENDPROC
  390 DEFPROCmoney(moneyX)
IFmoneyX<0 moneyX=0
  400 eX=moneyX DIV53+340:sX
=oldmoneyX DIV53+340:IF eX<s
X GCOL0,0:FORdX=sX TO eX ST
EP-8:MOVE dX,40:DRAW dX,56:
NEXT ELSE GCOL0,2:FORdX=sX
TO eX STEP 8:MOVE dX,40:DRA
W dX,56:NEXT
  410 IFmoneyX=0 PRINTTAB(5
,30);SPC1
  420 oldmoneyX=moneyX:ENDP
ROC
  430 DEFPROClevel GCOL0,6:
FORdX=340 TO levelX*134+340
 STEP8:MOVE dX,8:DRAW dX,24
:NEXT:ENDPROC
  440 DEF PROCtime(jX):IF j
X>oldtimeX GCOL 0,3:kX=(old
timeX*31)+340:lX=(jX*31)+34
0:FOR uX=72 TO 88 STEP 4:MO
VE kX,uX:DRAW lX,uX:NEXT EL
SE GCOL 0,0:FOR kX=(oldtime
X*31)+340 TO (jX*31)+340 ST
EP-8:MOVE kX,72:DRAW kX,88:
NEXT:SOUND0,-4,7,1
  450 oldtimeX=jX:IF oldtim
eX<0 oldtimeX=0
  460 ENDPROC
  470 DEFPROCsetup VDU17,13
4,17,4:PRINTSTRING$(28,CHR$
148):FORdX=1TO3:PRINTTAB(0,
dX);CHR$148;TAB(19,dX);CHR$
148;:NEXT:PRINTSTRING$(28,C
HR$148):PROCDBL6("Company C
ount",220,969)
  480 RESTORE250:FORdX=1 TO
 7:READ staff$(dX):PROCbox(
dX):NEXT:ENDPROC
  490 REM MAIN
  500 REPEAT PROCvars:PROCs
creen:PROCplay:UNTILFNagain
=FALSE:RETURN
  510 DEF PROCvars moneyX=7
142:oldmoneyX=0:oldtimeX=0:
rightX=0:countX=0:levelX=1:
endX=0:wrongX=0:tickX=0:END
PROC
  520 DEFPROCscreen COLOUR1
28:PRINTTAB(0,30);SPC39;:FO
```

```
RdX=1 TO 7:PROCwipe(dX):NEX
T
  530 VDU17,6,17,128,31,0,3
0:PRINT"Money";:PROCmoney(a
oneyX):VDU17,2,31,0,31:PRIN
T"Level";:PROClevel:VDU17,7
,31,0,29:PRINT"Time";:ENDPR
OC
  540 DEF FNcheck(A$):IF A$
="+" THEN=dX+eX ELSE IF A$=
"-" THEN=dX-eX
  550 dX=RND(10):eX=RND(10)
:function$=CHR$240+=dX+eX
  560 DEF PROCplay
  570 REPEAT FOR questionX=
1 TO 5:PROCrndquestion:corr
ectX=FNanswer(answerX):PROC
right_wrong(correctX):NEXT:
UNTILendX:PROCending:ENDPRO
C
  580 DEF PROCrndquestion R
EPEAT dX=RND(levelX*20):eX=
RND(levelX*20):function$=MI
D$("-+X",RND(3),1):answerX=
FNcheck(function$):UNTILans
werX)(levelX-1)*10 AND answ
erX((levelX+1)*10
  590 COLOUR3:PRINTTAB(0,26
)SPC40;:PROCclear:PROCDBLM(
STR$dX+function$+STR$eX+"="
,0,26):fX=POS:COLOUR1:PRINT
TAB(0,14);"Type your answer
 and"'"     press";:VDU17,5:
PRINT" RETURN":ENDPROC
  600 DEF FNanswer(answerX)
eX=0:function$="":VDU17,7:
TIME=0:*fx15,1
  610 REPEAT level$=INKEY$(
1)
  620 IF ASClevel$>=48ANDAS
Clevel$<58 AND LEN(function$
<=6 function$=function$+lev
el$:PROCDBLM(function$+" ",
fX,26) ELSE IFlevel$<>""AND
ASClevel$<>127SOUND1,-15,50
,1:*FX15,1
  630 IFASClevel$=13 AND fu
nction$="" PROCDBLM("PASS",
fX,26)
  640 IFASClevel$=13 THEN U
NTIL-1:=(VALfunction$=answe
rX)
  650 IFASClevel$=127 THEN
function$=LEFT$(function$,L
EN(function$-1):PROCDBLM(fun
ction$+" ",fX,26)
  660 tick=TIME DIV100:IF T
IME/100)=tick AND TIME/100(
tick+.16 PROCtime(30-TIME D
IV100)
  670 UNTIL TIME DIV100)30:
=1
  680 DEF PROCright_wrong(a
nsX) PROCclear
  690 IF ansX=-1 COLOUR6:PR
OCDBLM(" Nice one! That was
 ",0,13):COLOUR5:PROCDBLM("
correct!",6,16):PROCcorrect
  700 IF ansX=0 COLOUR6:PRO
CDBLM("Tough luck! That was
",0,13):COLOUR5:PROCDBLM("w
rong!",7,16):PROCwrong
  710 IF ansX=1 PROCtime(0)
:COLOUR6:PROCDBLM("     Too
 Slow!!     ",0,14):PROCwron
g
  720 IFquestionX=5 AND lev
elX=8 endX=TRUE ELSE endX=F
ALSE
  730 IFmoneyX)0PROCclear
  740 ENDPROC
  750 DEF PROCcorrect FOR d
X=100 TO 200 STEP 10:SOUND1
,-10,dX,1:NEXT:right%=right
X+1:=moneyX=moneyX+1428:PROC
money(moneyX)
  760 IFquestionX<5 THEN CO
LOUR1:PROCDBLM("You've got
 "+STR$rightX+" correct",0,2
0)
  770 IFquestionX=5 PROCpro
motion
  780 TIME=0:REPEATUNTILTIM
E DIV100)2:ENDPROC
  790 DEF PROCwrong wrongX=
wrongX+1
  800 FORdX=200 TO 100 STEP
-10:SOUND1,-10,dX,1:NEXT:mo
neyX=moneyX-5000:PROCmoney(
moneyX):COLOUR8:PROCDBLM(ST
R$answerX+"      ",fX,26):I
FquestionX<5 ANDrightX)0 TH
EN COLOUR1:PROCDBLM("You've
 got "+STR$rightX+" correct
",0,20)
  810 TIME=0:REPEATUNTILTIM
E DIV 100)2
  820 IF(wrongX=2 OR wrongX
=4) AND countX)0 PROCdemoti
on:countX=countX-1
  830 IF(wrongX=2 OR wrongX
=4) AND countX=0 questionX=
5:level%=0:endX=TRUE
  840 IFendX=FALSE AND mone
yX(=0 PROCbankrupt
  850 IFendX=FALSE AND mone
yX)0 AND questionX=5 PROCpr
omotion
  860 ENDPROC
  870 DEF PROCbankrupt PROC
clear:eX=3:function$="You a
re Bankrupt!":FOR dX=1 TO 1
8:eX=eX+4:IF eX)7 eX=3
  880 COLOUR eX:PROCDBLM(MI
D$(function$,dX,1),dX,16):N
EXT:questionX=5:level%=0:EN
DPROC
  890 DEF PROCdemotion PROC
wipe(countX):ENDPROC
  900 DEF PROCending IFcoun
tX)0 ANDmoneyX)0 PROCclear:
COLOUR2:PROCDBLM("You have
 succeeded",1,12):COLOUR5:PR
OCDBLM("in life as a",4,15)
:COLOUR7:PROCDBLM(staff$(co
untX),(20-LENstaff$(countX)
)DIV2,18):COLOUR3:PROCDBLM(
"with $"+STR$moneyX,4,21)
  910 IFcountX=0 PROCclear:
COLOUR3:PROCDBLM("You are",
1,15):COLOUR7:PROCDBLM("Une
mployed!",9,15)
  920 ENDPROC
  930 DEFPROCpromotion coun
tX=countX+1:=wrongX=0:IFrigh
tX=5 moneyX=moneyX+1000
  940 COLOUR1:PROCDBLM("You
 are now the",2,19):COLOUR7
:PROCDBLM(staff$(countX),(2
0-LENstaff$(countX))DIV2,22
):PROCpicture(countX):level
X=levelX+1:PROClevel:rightX
=0
  950 ENDPROC
  960 DEF PROCclear VDU28,0
,25,19,12:CLS:VDU26:ENDPROC

  970 DEF FNagain VDU28,0,3
1,19,26:CLS:COLOUR 1:PROCDB
LM("Another Game ?",3,0):VD
U17,5,31,4,3:PRINT"Press Y
or N";:*fx15
  980 REPEAT:function$=GET$
:IF INSTR("YynN",function$)
=0 SOUND1,-15,20,2:level%=0
 ELSE level%=-1
  990 UNTILlevel%:IFfunctio
n$="y"function$="Y"
 1000 CLS:PROCclear:=(funct
ion$="Y")
 1010 *FX200,0
 1020 VDU17,3,31,0,30:PRINT
"Press ";:VDU17,7:PRINT"BRE
AK ";:VDU17,3:PRINT"to exit
":REPEAT:FORA=1 TO 7:PROCwi
pe(A):NEXT:FORA=1 TO 7:PROC
picture(A):NEXT:FOR A=1 TO
7:TIME=0:REPEATUNTILTIME DI
V100)=2:NEXT:UNTIL0
 1030 REM relocate
 1040 *KEY0 *T.!MD%=PAGE-&E
00:FORIX=PAGE TO TOP STEP4:
!(IX-DX)=!IX:NEXT:!(TOP-DX)
=&FF0D:PAGE=&E00:OLD!MRUN!M
 1050 *FX138,0,128
```

This listing is included in this month's cassette tape offer. See order form on Page 53.

BACK TO BASICS

TREVOR ROBERTS does some down-to-earth talking

Assumptions

To follow Basics you'll need your Electron up and ready to go. So long as you've got the message:

```
Acorn Electron

BASIC

>_
```

you can join in.

PRINT, Return and blank looks

The first keyword we'll meet is PRINT. Notice that it's PRINT in capitals, not print or Print or whatever. The rule is that Basic keywords have to be in uppercase or "big" letters. So type in:

```
PRINT
```

using the Shift key and see what happens. The result is nothing. All you get is:

```
>PRINT_
```

which isn't very satisfying. What's wrong is that while you've typed something in, you've haven't told the Electron that you want it to obey what you've typed in. To do this you have to press the Return key which you'll find on the right of the keyboard.

In other words, the Electron will ignore what you type in until you press the Return key. So if you're ever staring at the screen wondering why nothing's happening, at least consider the possibility that the Electron is waiting for you to press Return. You can type until the seas run dry (or you've typed 255 characters, whichever comes first) but your Electron will ignore you until you press Return.

So try it now, press Return and the screen below the start up message will change from:

```
>PRINT_
```

to:

```
PRINT

>_
```

You've printed a blank line and now the Electron's prompt shows it's waiting for more commands.

Prompts and things

What you get on the screen when you power up, as plugging the Electron in is known, is the start up message. This tells you that the micro is an Acorn Electron (try to contain your surprise).

It also tells you that the Electron is using a computer language called Basic. If you want the micro to do anything you've got to talk to it in Basic. And that is what the >_ is there for. It's the micro's way of telling you that it's waiting for you to talk to it in Basic.

It's rather like rubbing a lamp and a genie popping out. When you power up, the Electron wakes up and is ready to obey your every command. But, like a genie, it will only obey certain words of power. And as abracadabra is not recognised by the Electron you have to learn a set of Basic keywords to control your micro.

You type these keywords into the Electron. The flashing line – the print cursor – shows where the next letter to be typed will appear.

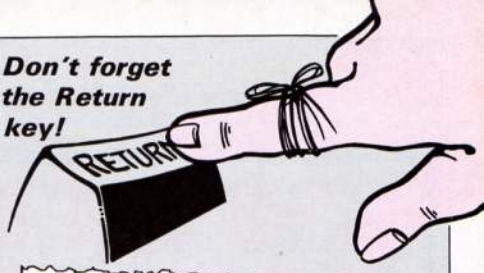
Strings

A collection of letters, numbers or punctuation marks, all lumped together and surrounded by quotes, is known as a string. So:

```
PRINT "1234%,!asdC"
PRINT "12 34"
PRINT "a string"
```

all use PRINT to display strings. And, as you can see, you can have spaces inside the quotes.

Don't forget the Return key!



Print something

It's not surprising that entering:

```
PRINT
```

and pressing Return results in a blank line. After all, you've told the micro to display something but haven't told it what to display! To get something to appear on the screen you have to use PRINT followed by whatever it is you want to appear. However, the message must be contained inside two pairs of inverted commas.

So, enter:

```
PRINT "Display this"
```

press Return and, provided you typed it in properly,

```
Display this
```

will appear on the screen. If you've made a typing error, don't worry, just ignore the messages and try again.

In fact you can get the Electron to display any message you like, provided that it's enclosed in inverted commas. So:

```
PRINT "anything"
```

and:

```
PRINT "12@as%"
```

will result in:

```
anything
```

and:

```
12@as%
```

appearing.

Notice that the inverted commas, or quotes as they are called in computer circles, don't appear. They're just there to mark out the beginning and end of the message for the Electron. If you must display a message with quotes in:

```
PRINT "Include "" quotes"
```

shows how it's done.

Immediate Action

Everything we've typed into the micro so far has had an immediate effect. Either the Electron did what you wanted or it immediately told you you'd made a mistake with an error message. This is because the Electron is in command, or immediate, mode. It takes the command and does it at once, so:

```
PRINT "Immediate"
```

is obeyed at once with:

```
Immediate
```

appearing on screen. But what of:

```
10 PRINT "RUN me"
```

where nothing happens when you press Return? Try entering:

```
RUN
```

and hit the Return key.

Congratulations, you've just run your first program.

SITUATION VACANT

Fast, accurait typist wanted for weary computerprogramer Apply box 999

Sum Printing

PRINT isn't restricted to just displaying messages. You can use it to do sums as:

```
PRINT 1+3
```

shows. You can also do subtraction,

```
PRINT 3-1
```

and multiplication,

```
PRINT 3*4
```

and division

```
PRINT 12/4
```

Notice, however, that computers differ from humans in the signs they use for multiplication and division. They use * instead of x and / instead of the normal divide sign.

AARRGGHHH!

If things go wrong, don't despair. Everyone makes mistakes at first and they're nearly always typing errors. Don't let it get you down, you want to be a programmer not a typist! And if you are a typist, console yourself with the thought that the key layout is different.

So if and when you make a mistake, just type the line in again, exactly as shown. If it's one of your own lines, remember that the keywords have to be in Basic and that strings have to be surrounded by quotes. Also to divide you use the slash mark, /, that you'll find on the ? key, and to multiply use the asterisk, *.

If something you've typed in has upset the Electron and all else fails, just press the Break key. This has the effect of starting the micro off from scratch again.

And finally, if the screen gets too cluttered, a quick CLS with the inevitable Return will clear it for you.

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TO ORDER TURN TO THE FORM ON PAGE 53

Micro Messages

Testing time for the Turbo-Driver

THE review of the Slogger Turbo-Driver for the Electron (Electron User July 1985) is both informative and helpful, but unfortunately it contains some minor arithmetical errors.

There are four comparisons, expressed as "times slower (faster) than" and of these three are incorrect. Thus in speed test 2 the figures, in seconds, are 41.49 for the Standard Electron and 11.06 for the Turbo Electron. The Standard Electron was therefore 41.49 minus 11.06 = 30.43 seconds slower than the Turbo Electron. That is it was almost three times 11.06 slower. The statement in the text is correct.

In speed test 4 the figures are 29.35 and 9.31. In this case the Standard Electron was 20.04 seconds slower. That is it was two times 9.31 slower, not three times slower as stated.

The same correction applies to test 5, where the figures are 22.85 and 7.73. Again the Standard Electron was two, not three, times slower.

Finally I quote: "If a BBC game crashes after running for one minute on a standard Electron it will crash after 20 seconds on a Turbo Electron, because it is running three times faster". It is not. It is running 40 seconds faster and 40 divided by 20 is two, not three.

There are two methods of making such comparisons:

● *Times as slow (fast, large, wide and so on) as, calculated by dividing the smaller number into the larger.*

● *Times slower (faster, larger, wide etc) than, calculated by dividing the smaller number into the difference between the two numbers.*

By definition, the second method must always be one less than the first. The two are frequently confused by writers and speakers. Perhaps they have been in this case. – **A.R. Smith, London SW19.**

● Maths never was my strong point, but whichever way you look at the figures the Turbo Electron is much faster than a standard Electron.

Roland Waddilove

AC adapter wanted

MY 19V A.C. adapter for my Electron recently broke.

I have tried to consult the dealer I bought the Electron from, but he has apparently gone bust. I also tried Acorn Computers without success.

I have tried to consult the dealer I bought the Electron from, but he has apparently gone bust. I also tried Acorn Computers without success. on what action I should take. – **M. Willis, 9 Emerson Close, Dudley, West Midlands, DY3 3BN.**

● Everyone who buys a Plus 3 disc drive receives a new power supply making their old one redundant. Consequently there must be literally thousands of old power supplies that are no longer needed.

Can any of our readers help out?

Looking for a butty

IN your July 1986 edition of Electron User *magazine, on page 4 there is an offer for Ten of the Best. While I was looking at the games, I realised I had not heard of Jam Butty, the first game on Volume 1. I looked in all the magazines since 1984, but I cannot find this game.*

Please could you tell me which issue it is in. – **Paul Davidoff, Addlestone, Surrey.**

● Jam Butty has never been published. It is a multi-screen, machine code arcade game which was written specially for Ten of the Best and is only available on this tape.

Atom Smash on Volume 2 of Ten of the Best is also a multi-screen machine code arcade game. This has not been published in *Electron User* and is only available on the tape.

Corrupted directory

*I HAVE a Plus 3 with my Electron and have seen friends with BBCs and 5¼in disc drives put &15 at the first byte, first track, first sector. When they then *CAT the program names don't appear and they are still able to boot up. Is there any way of doing this on the Plus 3 system without the error "Broken directory"?*

I have recently bought Repton and have quickly completed it.

The passwords are Chameleon, Terrapin, Sidewinder, Gecko, Python, Salamander, Iguana, Cuttlefish, Octopus, Giant Clam and The Kraken.

I have found your disc filing system sections helpful, keep them coming. – **Jason Shaw, Warley, West Midlands.**

● There doesn't seem to be any way of preventing the disc from being catalogued without corrupting the directory. Can any readers help?

The disc series has now ended, though if readers have any particular problems let us know and we'll do our best to help.

Better still, if you discover something new on the disc system why not write an article about it yourself?

Disassembled code saver

I RECENTLY ordered a couple of back numbers of Electron User, *and I am particularly interested in the Disassembler program you published in June 1985.*

With regards to this program, could you please tell me whether it is possible to save the code which the program produces to disc?

I have a book called Toolbox 2 by Ian Trackman and David Spencer that contains a Symbolic Disassembler, and this will save the output, but as it runs to 36 full A5 pages I am reluctant to type it in if there is an easier way. Can you help?

In Micro Messages in April

→

ALL programs printed in this issue are exact reproduction of listings taken from running programs which have been thoroughly tested.

However on the very rare occasions that mistakes may occur corrections will be published as a matter of urgency. Should you encounter error messages when you type in a program they will almost certainly be the result of your own typing mistakes.

Unfortunately we can no longer answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the mail pages.

From Page 47

1986 Ian M. Brown of Sheffield asks how the Centronics GLP printer produces graphics characters, the Greek alphabet, and maths symbols.

The only way I have found of doing this is to include something like:

```
10 PRINT CHR$(n)
```

where n is the Ascii code of the required character.

For example:

```
PRINT CHR$(156)
```

will produce the £ sign – impossible otherwise, unless a printer driver is used with View. – **Peter R. Wintle, Street, Somerset.**

● The Disassembler can be modified quite easily. Add these two lines:

```
85 *SPOOL Code
145 *SPOOL
```

and all output to the screen will be echoed to disc.

The file can be loaded into a word processor, modified, line numbers added and saved again.

EXEC it back in and you'll have a Basic assembly version of the machine code program.

Religious program

AS an Electron enthusiast of some four months I must congratulate you on an excellent magazine.

I have an idea for a new game/study program.

Insted of using sci-fi and adventure themes, what about a historical or religious theme?

I am thinking of doing just that on the story of St. Bernadette of Lourdes (1858-1879) and Our Lady.

As a Roman Catholic – I know there must be others among your readers – I have enough material to make up a game/study program.

If any reader would like to let me know I would gladly give more details of a rough construction plan.

I cannot yet do the complete program as I am rather disabled. So would any reader be willing to assist me in this way? – **David F. Smith, Willow Cottage, 3 Goosetree Estate, King's End, Wisbech, Cambs PE13 4DE.**

● Can any of our readers help David?

Help on The Way

I HAVE a few tips for players of The Way of the Exploding Fist.

From novice level up to 2nd Dan use the forward sweep to combat your opponent. From 3rd to 5th Dan use the same kick but fool the opponent by withdrawing your kick just before it is in operation.

Your opponent will jump so that when he lands you can use the forward sweep before he has time to jump again.

From 6th to 10th Dan you must show defensive combat because your opponent will be smart. I have reached 9th Dan and soon hope to beat 10th Dan.

Keyboard control is best for this game, it gets simple once you have used it often enough.

I would like to thank all the people who wrote to me as a result of my letter about penpals in the October 1985 issue. – **Andrew McIntyre, Tranent, East Lothian.**

Vulcan joystick

I WAS flipping through some old issues of Electron User, *when I noticed, in Micro Messages (Vol. 2 No. 9) a letter from a M.P. Park, who was experiencing problems using his Vulcan joystick interface with the game Gauntlet.*

You replied that this only works with the First Byte interface, but this is not the case. I also own a Vulcan interface and it works perfectly with Gauntlet and other First Byte-compatible Micro Power games.

M.P. Park has probably solved his problems, but for other users with problems, just follow the instructions below:

If a Quickshot II is owned, turn off the automatic fire. Chain the game as normal and type Y to joystick option.

Type FCCO when asked for joystick address. (this also the First Byte address.)

Type 0 and move the joystick address. (This is also the First Byte address.)

Congratulations on a superb magazine, especially Merlin's Cave (more help on Hampstead please) and ten out of ten for the new format on software. – **Matthew Biddgood, London SE5.**

T2CU connection

I HAVE recently ordered a Cumana disc drive and interface for my Electron and am considering buying a T2CU from Slogger which would allow me to transfer most cassette software to disc.

My problem is how to connect the T2CU to my computer. Does it fit directly to the Plus 1 or would I need something like a Rombox or ACP's ROM adapter?

I think you should have more programming tips in Basic and machine code.

I'm sure that all Electron users also like to know more about the expanding world of the Electron and about all the add-ons being brought out for it. – **Ian Oliver.**

● You could use a Rombox or ACP's ROM adapter, but there's another simpler alternative.

If you take the back off Cumana interface you'll see an empty ROM socket. Plug T2CU into this.

Different codes

PLEASE could you tell me if the Tape to Cumana ROM works with the Plus 4 by ACP in the spare ROM socket? – **Christopher Lindsay, Stockport.**

● Slogger's T2CU will not work with ACP's Plus 4, only the Cumana disc interface.

The reason is that the Cumana interface uses the Western Digital WD1793 disc controller while the Plus 4 uses the WD1770 or WD1772 controller. They require totally separate code to operate them.

Pirate on board

THIS is for anyone who has got Aardvark's excellent game Zalaga. Load the first part by typing:

```
LOAD ""
```

Then type:

```
PROCpugwash
```

Something should now happen. – **James Walker, Orpington, Kent.**

● If the program detects that it has been copied it executes PROCpugwash. Captain Pugwash is, of course, a pirate!

Tinny trap

I WAS working on my Electron when a row of keys – Return, Delete, Up Cursor and Equals went dead.

Because I work in a company that manufactures keyboards I recognised this as a probable fault in the connection between the keyboard and the main circuit board.

When I opened up the machine by removing the four screws on the underside I was disgusted to find that the flexible circuit connector and

WHAT would you like to see in future issues of Electron User?

What tips have you picked up that could help other readers?

Here is your opportunity to share your experiences.

Remember that these are the pages that you write yourselves. So tear yourself away from your Electron keyboard and drop us a line.

The address is:

Micro Messages
Electron User
Europa House
68 Chester Road
Hazel Grove
Stockport SK7 5NY.

the pins on the circuit board were tin plated.

This is a notoriously unreliable connection for TTL signal currents. The only reliable contact surface is a gold flash.

To cure the contact problem the 22 way flexi connector should be carefully eased off the pins and replaced again. This may save a reader an otherwise expensive repair bill for the same action taken in a workshop.

If the Electron is still under warranty it should, of course, be returned to the supplier. – **Trevor L. Roberts, North Ascot, Berks.**

Slowcoach text

WITH reference to Mr. Akenhead's letter in the June Electron User, *the short procedure listed below will provide slow text printing to the screen.*

Missing out the condition in line 110 will give a delay between letters rather than between words.

```
  10 REM Slow Print
  20 REM By P.Sugden
  30 CLS:PRINT
  40 string1$="Put your me
ssage etc. in the form of a
 string taking care to lea
ve spaces to  avoid splitt
ing words at the end of
 lines."
  50 string2$="You can use
 as many strings as you lik
e but cannot use more than
255 characters per string."
  60 PROCslowrite(string1$
)
  70 PROCslowrite(string2$
)
  80 END
  90 DEF PROCslowrite(stri
ng$)
 100 FOR NX=1 TO LEN strin
g$:PRINT MID$(string$,NX,1)
;
 110 IF MID$(string$,NX,1)
=" " THEN FOR delayX=1 TO 1
000:NEXT
 120 NEXT
 130 PRINT
 140 ENDPROC
```

– **Peter Sugden, Huddersfield, Yorks.**

The economical Electron

WE have set up a simple but effective communications link between two Electrons. I and my counterpart are fortunate to live in adjoining properties so the possibility of a wire link was considered.

One of the main criterions was cost, so we chose to use the simplest serial data output, the cassette interface.

The relatively low level output was boosted by using two old cassette recorders with monitor facilities (see Figure I).

The output of one Electron was connected to the input of the other and vice-versa (Figure II).

To send messages a short program is used to input data into an alphabetic string then saved as a file. The opposite Electron then loads the file and displays the message, naturally using the same filenames.

After the message has been transferred the program toggles and the process is reversed, so producing a bi-directional link sending at least a screenful of information.

The link can also be used to send Basic programs by saving and loading in the normal manner.

The program has been a great source of amusement and has saved a fortune in telephone calls.

By using the save and load game routine in Acornsoft's chess program, it is possible to play inter-house chess matches. – **Richard Williams and Roger Bainbridge, Keyworth, Nottingham.**

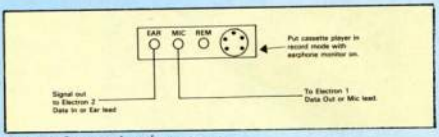

Figure I: Cassette input/output ports

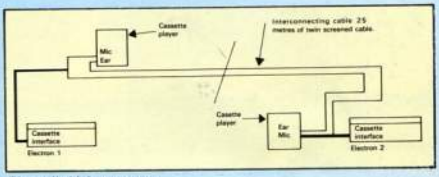

Figure II: Linkage system

Mouse Trapped

I RECENTLY bought Mouse Trap and have managed to clear the first and second screen but I can't clear or even get started on the third one.

If anyone has managed to clear it please could you give me some advice? – **Wayne Gilbert, Borehamwood, Herts.**

Electron interface

MY son received his Lego club magazine which described an interface to enable a Lego model to be controlled by either a Spectrum or a Commodore. Also shown was an interface for the BBC Micro (for educational use only).

Can you advise me if you know of an interface for the Electron, how much it costs, and the supplier? – **George Baile, Paisley, Renfrewshire.**

● With a Plus 1 and Advanced Computer Products, Plus 5 interface you should have nearly all the plugs and sockets available on the BBC Micro. You might then be able to use the BBC Micro interface.

ACP's Plus 5 will be available shortly.

Disc Menu tip

MANY thanks for a useful magazine. Here is one small tip to pass on for Plus 3 users who have used Roland Waddilove's Disc Menu.

*When building the !BOOT file make your first line *DIR$. This saves you putting the menu into all the different directories, or having to press Ctrl+Break before Shift+Break.*

Only a small tip, but a useful one for beginners like me. – **Andy Smith, Bristol.**

Dealing with robots

HERE are three tips when playing Acornsoft's Maze game:

● *Robots never pass over the three tags. The tags can be used to block the passage of robots or block off dead ends or block yourself in.*

● *New robots always appear randomly on one of the power points, so make sure when you kill a robot you are not standing on or near a power point.*

● *When presented with a choice between a left turn a right turn or straight on a robot will turn left.*

With a choice between straight on and right it will go straight on otherwise it will turn right. – **S. Isaacs, M. Dolly, Orton Goldhay, Peterborough.**

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Also on the September tape: **CAVERN CAPERS** Blast your way from the depths of the labyrinth to escape from the planet. **DRAW WRITER** A superb utility to translate your on screen graphics to the procedures to create them. **COMPANY COUNT** Work you way up the company pecking order in this educational maths test. **TEN-LINERS** Our stunning short routines.

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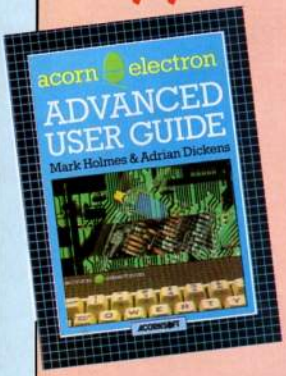

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START OF A NEW SERIES

10 LINERS

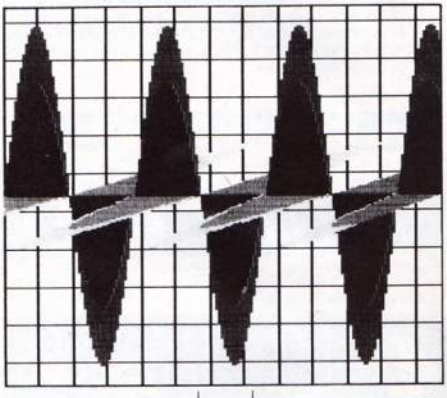
TEN-LINERS is a new feature consisting of short, simple programs sent in by our readers. They can be utilities, games, maths programs or graphics demonstrations – they're all welcome here.

The only requirement is that they are no longer than ten lines, so it's a real brain teaser.

Ten lines may not seem many, but it's surprising what can be achieved with a little imagination. Have a look at this month's selection . . .

3D Sine Curve

HERE'S an interesting variation on the sine wave theme – it's a three dimensional version!

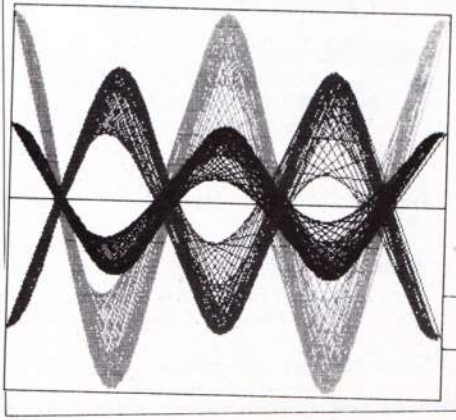


```
   1 MODE 2:VDU 29,0;511;2
3;8202;0;0;0;
   2 A=COS(60):B=SIN(60)
   3 FOR I%=0 TO 1279 STEP
 100:PROCplot(4,I%,-500,0):
PROCplot(5,I%,500,0):PROCpl
ot(4,0,I%-640,0):PROCplot(5
,1500,I%-640,0):NEXT
   4 FOR I%=0 TO 1279 STEP
 4
   5 A%=SIN(I%/61)*300:B%=
A%+1.5:GCOL 0,1:PROCplot(4,
I%,0,0):PROCplot(5,I%,0,A%)
:GCOL 0,4:PROCplot(5,I%,0,B
%):GCOL 0,6:PROCplot(4,I%,0
,0):PROCplot(5,I%,A%,0):GCO
L 0,2:PROCplot(5,I%,B%,0)
   6 NEXT
   7 END
   8 DEF PROCplot(K%,X%,Y%
,I%)
   9 PLOT K%,X%+A*I%,Y%+B*
I%
  10 ENDPROC
```

Web Wave

THIS listing uses your Electron's superb graphics facilities to picture three interacting sine waves in different colours.

If you don't know what a sine wave is, don't worry, just admire the artwork.



```
   1 MODE 6:PRINT "Please
wait..."
   2 DIM C(255):FOR I%=0 T
O 255:C(I%)=COS(I%/20):NEXT
   3 DEF FNcos(A%,B%)=C(A%
/5)+B%
   4 MODE 1:VDU 23;8202;0;
0;0;
   5 DRAW 0,1023:DRAW 1279
,1023:DRAW 1279,0:DRAW 0,0:
VDU 29,0;511;:MOVE 0,0:DRAW
 1279,0
   6 PROCCurve(1,500):PROC
Curve(2,-350):PROCCurve(3,2
00)
   7 GOTO 7
   8 DEF PROCCurve(COL%,HE
IGHT%) C%=30:GCOL 0,COL%
   9 REPEAT MOVE 0,HEIGHT%
:FOR X%=0 TO 1279 STEP C%:D
RAW X%,FNcos(X%,HEIGHT%):NE
XT:C%=C%+5:UNTIL C%>325
  10 ENDPROC
```

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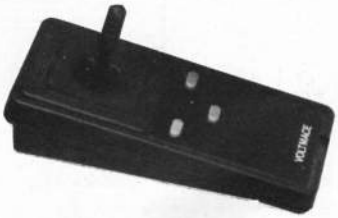

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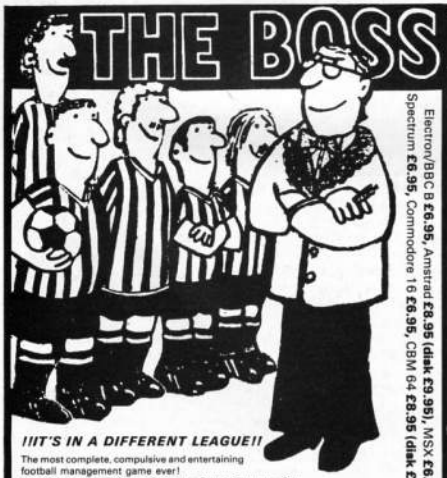

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Making the most of your memory

DAVID RICHARDS reviews Starstore, Slogger's ROM-based database

Product: Starstore
Price: £21.95
Supplier: Slogger, 107 Richmond Road, Gillingham, Kent. Tel: 0634 52303

STARSTORE is a ROM-based database from Slogger for the Electron. As with all Slogger's ROM software you'll need a Rombox or equivalent to use it.

It's designed primarily for the person who uses tape as the method of storage – random access filing isn't possible – but disc users shouldn't be put off since the ROM works equally well with discs.

It enables you to use the whole of the Electron's memory for storing and retrieving information in the form of files which are subdivided into records and fields.

Starstore is called with *STARSTORE or any abbreviation of the word. This brings up the main menu displaying a total of 12 options shown in Figure 1. All are self-explanatory.

The first one you'll use is Create a new file. This allows you to initialise a file consisting of up to 255 records which can have up to 30 fields each containing between 1 and 127 characters per field.

When creating a new file you are prompted for the name of each field and its size. Pressing Escape at any time returns you to the main menu and sets up the required database with the number of fields entered at that point.

There's a useful illustration of how to set up an address/telephone number book in the manual that should help to get you started.

Several commands use the Control key and the appropriate letter, permitting movement around the records to a specified record number, the next free record and so on. A total of 12 control keys are used which are easily memorised.

When loading a file from tape or disc the filename may take any legal form and Starstore will detect if a file is not a database, and report the fact accordingly. Any file error messages are displayed in the normal manner.

On entering the examine/update facility the record is displayed, and at the bottom of the screen the record number is shown.

The cursor keys are used to move around the record being created and information can be entered directly.

The Return key moves to the next field, or to the next record if pressed when the cursor is positioned on the last field.

Adding or deleting fields is possible by calling the appropriate option from the main menu.

Option 7 on the main menu permits a search of the whole database for specific information in the records either by the use of one or more parameters as prompted for.

Escape activates the search and the use of ? as a wild card character is permitted.

Information can be sorted by setting the sort parameters in the order of priority. For instance, you can sort by surname in preference to christian name, though you can't use the same priority value for more than one field.

Escape starts the sorting, which can take up to one and a half minutes depending on the number of records to be handled.

All the records found in the search are then displayed as record numbers, otherwise the "No search data found" message is displayed.

Records found are referred to as subset records, and those not found are referred to as inverse records.

There are several different ways of printing the information held in the database. You can print all records, subset records or inverse records, specifying the fields you want and their order.

The last option on the main menu offers a choice of foreground colour. The default is green, but it can be set to any valid colour except black.

The comprehensive instruction manual supplied with Starstore gave me the feeling that it was primarily designed to be used with Slogger's Starword word processor.

It actually isn't necessary, but if you do have Starword there are one or two extra facilities available such as mail merge.

For the technically minded – and I'm not – the manual carries all the information for you to write your own file handling facility for changing the order of the fields or the merging of them and so on.

Star commands are not recognised by Starstore and are therefore passed on to the operating system which permits access to utilities and to return to Basic from within Starstore.

This is another excellent package from Slogger, a company that seems to concentrate on using the Electron's capabilities to the full.

Starstore is a superb database for Electron users on its own, and gives added value when combined with Starword. ■

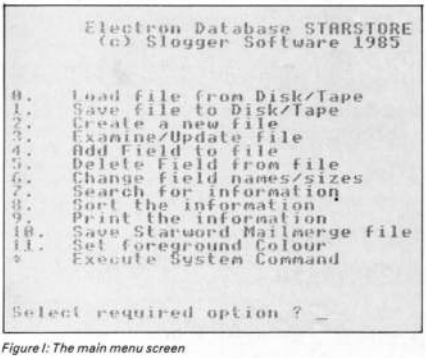

Figure 1: The main menu screen

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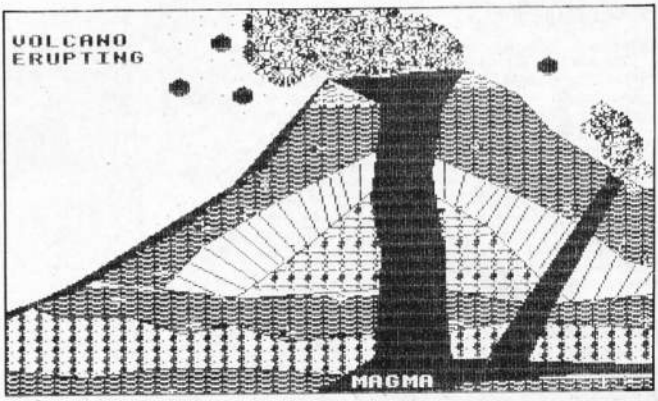


Quality printing at a nice price

ROGER FROST reviews the Taxan/Kaga KP810

THERE'S been quite a lot of good news for Electron owners recently. Of particular interest has been the number of good quality printers now available.

Among these is the Taxan/Kaga KP810 which, by shopping around, you can usually get at a bargain price.

This printer uses a dot matrix to form its letters. This is the standard type of medium priced printer and means that with text you can see the dotty nature of the letters.

Dot matrix printers are excellent for printing graphics as well as the more normal text.

The KP810 comes ready to use with any paper up to 10in wide. There's no extra to pay for tractor feeds, roll paper holders or single sheet mechanisms. This printer can cope with the lot.

Fitting paper is easy and admirably described in the comprehensive user guide provided.

One extra you will need is the cable linking printer to Electron. This is because the printer is designed to be used with a wide variety of micros and different computers use different connectors. Some dealers will supply the lead at no extra cost.

One of the main things to look for when buying a printer is Epson compatibility.

Printers have to understand the commands sent from the micro and much commercial software assumes that you've got an Epson-compatible printer – that is, one which understands the same control codes as an Epson printer.

The Taxan is fully Epson-compatible. This means that, for instance, Mini Office works perfectly and its double height and width modes are printed out properly.

Like many current printers the Taxan features a near letter quality or NLQ mode. In this each line of text is printed twice and the paper is moved 1/20th of an inch betweeen the prints.

This masks the dot matrix nature of the printing, and as a different character set is used with proper descenders, a very good standard of printed text is achieved.

There are three ways of obtaining NLQ mode. A command can be sent by the Electron, and could be used from within your own programs.

Secondly an internal switch can be set so that the printer always runs in NLQ mode.

Lastly, and most easily, if the form feed switch is held down while the power is switched on the printer will automatically enter NLQ mode.

The KP810 controls are simple. There is a power on/off switch and only three other controls are used for most work.

The on-line switch can be used to interrupt printing and take the printer off-line. The Electron will wait until the printer is ready and on-line again before sending more data.

While the computer is off-line the line feed switch will advance the paper one line and the form feed switch will move the paper to the start of the next page.

One extra switch allows you to turn off the out of paper warning. This is useful when working with single sheets of paper as it allows you to print right down to the bottom of the page.

Inside the computer are 20 more switches called DIP switches.

They are used to select such things as the character set – English and foreign – and the mode of the printer. Most will rarely need to be altered.

This is just as well because the machine has to be part dismantled to get at them. That's a real pity, particularly as the automatic paper feed switch is down there, too.

Different print styles are easily selected by sending the appropriate control codes. The two popular typewriter sizes, Pica and Elite, can be chosen, as well as a condensed mode which allow 132 letters across page rather than the normal 80 characters.

Italic or enlarged text can be selected and subscripts and superscripts are possible, along with foreign language accents and underlined text.

Text can be spaced proportionally, which means that the thin letters such as 'I' take up less room than fat letters like 'W'. As a result the print has a much neater appearance.

One piece of software you will need is a screen dump, which copies the contents of the screen, graphics and text to paper. The screen dump used for the illustration above was featured in the March

→

From Page 59

1985 issue of *Electron User*.

The KP810 is a black and white printer, but a good screen dump will print the colours in different shades of grey.

Getting the best of the extra features requires a good user manual. Unfortunately the Electron and BBC computers handle commands in a different way from the examples given in the handbook.

Once you've got the hang of how to enter commands for the printer it's quite easy, but if you're not sure this handbook will give you problems – though having said that it's still one of the best printer manuals around.

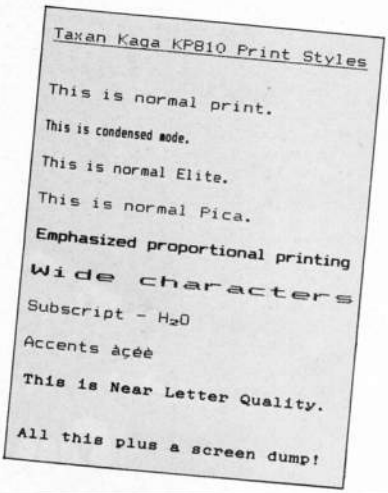
The Taxan, like many other printers, has its cables in the wrong place. Round the back of the printer there is an area of chaos, with cables and paper all fighting for the same bit of space.

This is fine if you can leave things permanently set up, but very awkward for moving. Apart from that the KP810 is well built and attractively styled.

Its excellent NLQ, its fast – 140 characters a second – printing, its ability to cope with many types of paper, plus good graphics and many print styles make the Taxan Kaga KP810 very good value for money.

If you want a good, medium priced and versatile printer this could well fit the bill. ■

Product: Taxan/Kaga KP810 Printer.
Price: £279 ex. VAT.
Supplier: Taxan, Taxon House, Cookham Road, Bracknell, Berkshire RG12 1RB. Tel: 0344 484646.



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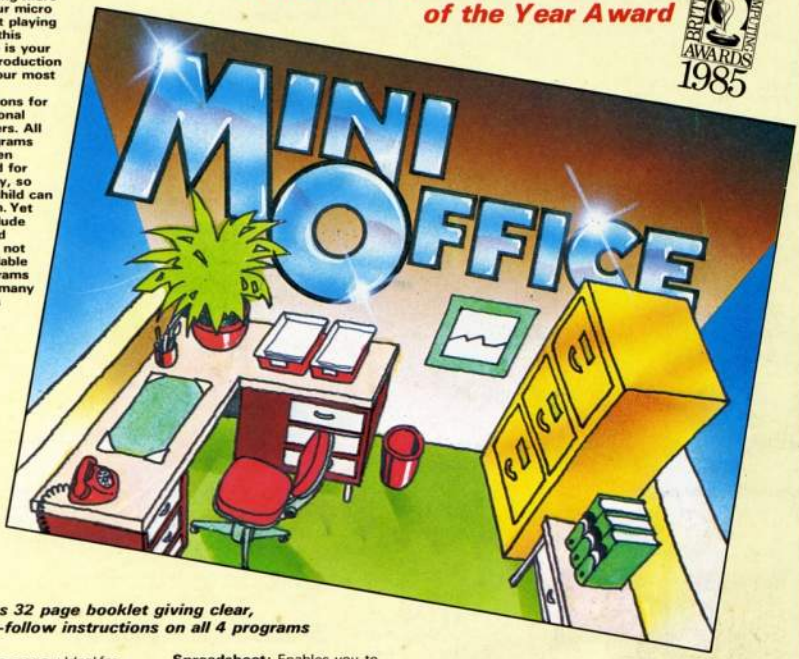

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Thrust is simple, fun-to-play, yet totally realistic and intensely challenging. Your mission is to visit 24 planets in turn collecting the Klystron Pods and, if possible, destroying each planet's reactor system. Your spaceship and the pods, which are heavier than the spaceship, move authentically subject to the laws of gravity, inertia and momentum — indeed the game's author, Jeremy Smith holds a First-Class Honours degree in Physics! Careful planning of your manoeuvres is essential in order to prevent the pods swinging out of control and dragging your spaceship to destruction.

To add to the challenge, the planets have different gravity rates and, as you progress through the game, some have "reverse gravity" or "invisible landscapes". They are defended by automatic limpet guns strategically placed to protect the pods and fuel tanks — the only source of replenishment for your limited fuel supply. The smooth screen-scrolling, which is exemplary, and the realistic action gives the player a fascinating feeling of floating through space.

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